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Testudostan: Our Post-Cold War Global Exploitation of a Noble Tortoise

David S. Lee
The Tortoise Reserve
PO Box 7082
White Lake, NC 27614
torresinc@aol.com

Katrina Smith
PO Box 22321
Baltimore, MD 21203

Abstract

From both the point of view of a person seeking a pet and from a conversation perspective Russian tortoises are one of the worst possible candidates available from the wild-caught reptile pet trade. Yet, for a variety of political and economic reasons this small tortoise has become one of the most commonly marketed species. Since the 1970s well over one million wild-caught adult Russian tortoises have been imported into the U.S. alone. Probably less than one or two percent of these are alive today.

Testudo (*Agrionemys*) *horsfieldii*, the Russian tortoise (Figure 1), is distributed throughout much of central Asia from northern and eastern Iran, Afghanistan, northern Pakistan, and northwest China, to the southern territory of the former Soviet Union, and throughout various ex-Soviet republics — Kazakhstan, Kirgizia, Tajikistan, Turkmenia and Uzbekistan (Figure 2; Iverson, 1992). Despite this seemingly extensive distribution, much of this area consists of climates, habitats and elevations of either marginal use or unsuited for these xeric tortoises. Based on Iverson's distribution map for this species these tortoises appear to be mostly limited to sites in valleys along major rivers. The climatic extremes result in abbreviated periods of annual activity; in some cases this can be less than two months (Atayev, 1985), and protracted periods of estivation and hibernation. In much of central Asia, estivation starts in May–June with the desiccation of ephemeral vegetation. In some areas estivation extends directly into hibernation and the tortoises remain inactive for three-quarters of the year or more. Lagarde et al. (2003) demonstrated these tortoises were active only three months of the year, and during this active season they were inactive 90% of the time. Adult tortoises spent less than 15 minutes a day foraging. They do not feed on grass and typically forage on plants highly toxic to grazing mammals, thus avoiding competition with them.

Figure 1. Russian tortoise, *Testudo horsfieldii*. Photograph by Michael Redmer.

Three subspecies have been recognized but subspecific characteristics overlap geographically and detailed genetic studies and statistical analysis would be useful to determine the validity of these subspecific designations. A considerable number of publications have addressed the issue as to whether or not this tortoise should be considered as a separate genus—*Agrionemys*—or whether *Agrionemys* is a subgenus of *Testudo* (Nikolsky, 1915; Smith, 1931; Loveridge and Williams, 1957; Crumly, 1988; Bour, 1988; Das, 1991). The fact that Russian tortoises can hybridize with *T. hermanni* in captivity (Kirsche, 1984) suggests they should remain in the genus *Testudo*, and that the subgenus *Agrionemys* is not valid.

In the past this tortoise has been placed in the genera *Homopus*, *Testudinella*, *Medaestia* and *Agrionemys* as well as under different species names—*burnesii* and *baluchiorum*. At times the races *kazachstanica* and *rustamovi* have been considered full species. The Russian tortoise also has been given quite a variety of English common names, including: Central Asian tortoise; Four-toed tortoise; Afghan tortoise; Steppe tortoise; Horsfield's tortoise. A review of the current systematics of the species is as follows:

Testudo horsfieldii Gray, 1844:7, Type locality: Kabul, Afghanistan.

T. horsfieldii horsfieldii Gray, 1844:7, as above.

T. horsfieldii kazachstanica (Chkhikvadze, 1988:110), Type locality: Karatal, southern Pribalkhashye [= region south of Balkhash Lake, Kazakhstan].

T. horsfieldii rustamovi (Chkhikvadze, Amiranashvili and Ataev, 1990:72), Type locality: Madau Village, Kizyl Atrek Region, southwestern Turkmenistan.

Compared to any of our North American tortoises, or even some other species of *Testudo*, relatively little has been published on the natural history of Russian tortoises (see summary in Kuzmin [2002]). However, *Testudo horsfieldii* is well known from a physiological perspective. Fascinated by this tortoise's ability to survive cold temperatures for extensive periods, Russian biologists and the medical profession have focused on the species' "built-in antifreeze." The literature on the blood chemistry of these tortoises is extensive. It was apparently this knowledge that directed the decision to have a Russian tortoise become the first vertebrate to be launched into space. In Russia's effort to lead in the space race they picked the pint-sized

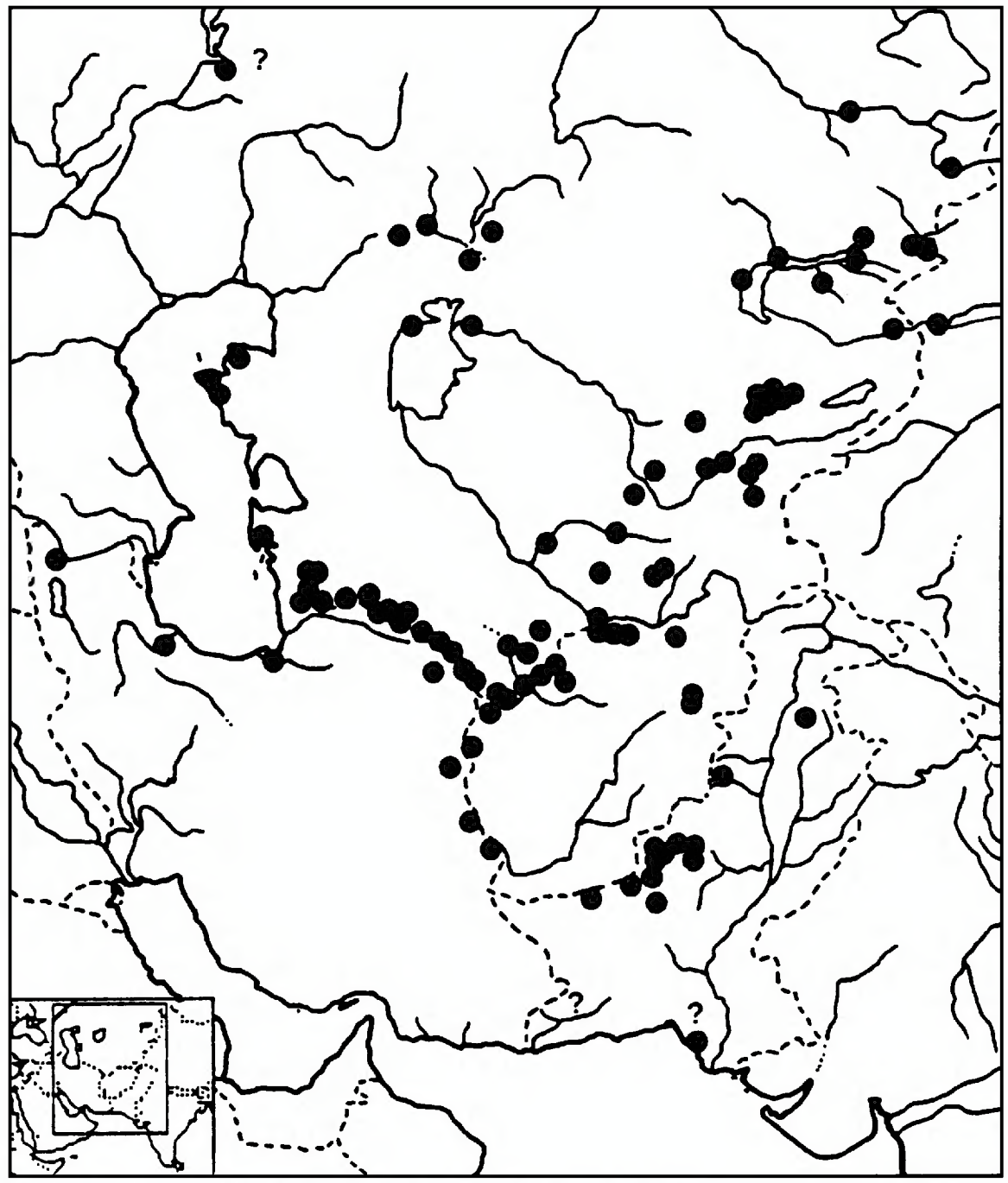

Figure 2. Distribution of *Testudo horsfieldii* (from Iverson, 1992).

reptile to be their first "astronaut." So while Russian tortoises inhabit desolate and arid portions of countries and republics most of us would have difficulty finding on a map, they are on the forefront of our understanding of reptilian physiology, pioneers in space exploration, and well known in the pet trade.

The pet trade? Yes, unfortunately they have become one of the major exports of Middle Asia, and what follows is a rambling essay on a serious conservation issue. Of all the wild-caught reptiles currently in the pet trade, from both husbandry and conservation perspectives, it is hard to think of a less ideal candidate for a pet or for mass commercial exploitation.

While there are few studies on former and current population densities, based on habitat photos provided by Kuzmin (2002) it is difficult to think that the barren, arid landscapes depicted could support even modest densities of tortoises. Studies in Kazakhstan seem to be the most complete. In the 1950s, populations ranged from 5 to 72 individuals per hectare with the variation driven by habitat and latitude (Paraskiv, 1956). Similar studies conducted a quarter of a century later (1975–1979) indicated 0.2 to 29 individuals per hectare (Kubykin, 1982). By 2000, densities in the same region were estimated to be 3.9 to 10.3 tortoises per hectare (Kuzmin, 2002). In specific situations densities can reach 2,000 individuals per square kilometer, but typical densities were much lower even in the 1950s. Bogdanov (1962, 1965) indicated densities ranged from 0.5 to 50 tortoises per square kilometer. Thus, while the density studies are scattered in both time and location, and are based on far from conclusive data from the last half century prior to the international pet trade through the present, they suggest a marked decline, and show that natural population levels in many areas are quite low. Kubykin's (1982) studies in Kazakhstan caused him to recommend decreasing allowed annual harvest and export as early as the 1980s. The overall size of wild-caught tortoises imported into the U.S. for the pet trade has decreased noticeably over the last two decades. It is not clear if this is a result of the centers of massive collection having shifted to areas of the species' range where the tortoises are naturally smaller, if smaller sized individuals are being selected to reduce shipping cost, or if the overall average size of individuals the wild population has been reduced as a result of overcollecting.

There is surprisingly little information on the natural history of wild Russian tortoises. Based on what is known, and what has been learned about other tortoise species, the biology of this tortoise marks it as a poor candidate for long-term commercial harvest. The reproductive output of Russian tortoises is modest and is what would be expected for a tortoise of their size, up to about 12 eggs annually, occasionally more, deposited in 2–3 nests. There is little published information on survival of nests or young, but based on studies of other tortoise species living in xeric environments it can be expected to be low. Unpublished studies in Uzbekistan resulting from attempts to document sustainable economic use indicate that adult females tortoises produce 3 eggs annually, a 70–90% predation of first-year tortoises in the wild, natural densities ranging from 0.5 to 43

tortoises/ha, and areas of concentrations in southern Uzbekistan where 15.5–16 million tortoises occur with a total population of 20–30 million. Most of this research was generated by a commercial exporter, by its own scientific department, and it is used primarily to justify continued exploitation of the species. This exporter has continued to produce streams of professional presentations at scientific meetings and publications on various aspects of the biology, husbandry, and sustainability of export. Yet, while most or all of the information may be true, because of conflicts in interest, it certainly remains suspect.

Like most tortoises in the wild, and as would be further expected by their brief period of annual activity, Russian tortoises exhibit slow growth. Published age estimates of various size classes are not from long-term field studies. They all seem to be based on growth ring counts. Males mature earlier and at smaller sizes than females. Reported ages based on annuli indicate nine years for females to reach 10 cm. Maturity is first attained at 10–11 cm for males and 13–14 cm for females, and for them sexual maturity may take from 10 to 15 years (Chernov, 1959). Maximum reported size for females is 28.64 cm, but size and growth varies geographically (Yakovleva, 1961; Ananjeva et al., 1998). With other studies age of maturity has been estimated at 10–25 years. However, growth rings have been shown to be unreliable, meaningless, and even outright misleading in aging turtles and tortoises (Wilson et al., 2003) and in most cases counting the number of rings greatly underestimates the actual age of individuals. Furthermore, these rings are particularly difficult to count on Russian tortoises, even small ones. Whatever the case, it is clear that Russian tortoises, despite their small size, are slow to mature. Droughts and other events would be expected to further slow annual growth rates and affect the general health of all age classes. Longevity information is all but lacking, but based on long-term captives imported as adults, it certainly exceeds 50 years.

No turtle or tortoise population can support a sustained harvest. This has been demonstrated for many species in a number of areas throughout world. This is true for both the adults and their eggs. Even fast-growing turtles that produce large egg clutches, such as common snapping turtles and softshells, cannot support a sustained harvest. The only variation is that some species respond more immediately to commercial exploitation than others, but all populations collapse eventually with any level of continual take (Doroff and Keith, 1990; Ceballos and Fitzgerald, 2004; Congdon et al., 1994; Gibbons et al., 2000). Slow-growing, xeric tortoises with limited reproductive output are probably the worst chelonians to consider for commercial harvest.

Soviet conservation legislation is all but non-functional, and in the various ex-Soviet Republics its effectiveness is highly variable, leading to illegal collecting and trafficking between, and export from, the various political units. Thus, the exporting republics are not necessarily the ones from which the tortoises originate. It appears the animals are being "laundered" from "closed" republics through "open" republics. The collecting of any reptile is prohibited without official government permits, but no more than 15% of the tortoises are taken with official government permission (Kuzmin, 2002). As of 2002, other than Russia and Uzbekistan, none of the former communist bloc republics are CITES members. In 1977, along with other tortoises, the Russian tortoise was listed as CITES Appendix II, meaning that the exporting countries need to approve international transactions and verify that the commercial market will not negatively impact wild populations. Revised annual quotas for export (2001) of Russian tortoises are 35,000 for Uzbekistan and 39,000 for Kazakhstan. There is little political cooperation between republics so suppliers and exporters simply work the system, and numbers appearing in paperwork only account for the legal exportation; real numbers may actually represent 200,000 tortoises per year. These numbers are rather consistent with what was reported prior to the break-up of the Soviet Union. Between 1968 and 1978, 13 government-licensed collectors averaged 193,947 turtles and tortoises per year for the pet trade. Nearly all of these were *Testudo horsfieldii*. Pet trade harvest pressure on Russian tortoises has increased in recent years as European Union counties and CITES regulations have diminished the pet trade markets for Greek and Hermann's tortoises. It is impossible to say if the recent price jump in Russian tortoises is a result of tightened regulations on these other species, if wild tortoises are harder to come by, or if the middlemen are simply taking bigger cuts of the profits. Much of the information presented in this paragraph comes from Kuzmin (2002). It is interesting to see his spin of the issues, after citing all the figures on collecting and discussing both internal and external pleas for tighter regulations, he downplays the problem and considers the tortoise populations stable and the harvest sustainable. The text is all but paradoxical.

The European Union became concerned with the import of wild-caught Russian tortoises into European countries; this in turn resulted in development of a program for sustainable economic use for Uzbekistan. Their national Strategy Action Plan calls for captive breeding, and collection of eggs from the wild for sustainable use. The captive-hatched tortoises are exported to Europe, and the wild-caught ones to the United States. The company overseeing the tortoise farming operation is exporting both wild-caught and captive-hatched tortoises and they estimate that they need a standing brood stock of 13,000 adult tortoises to produce their current goal of 25,000 captive-hatched per year.

So where are these tortoises coming from? Most are being collected in the various ex-Soviet republics. *Testudo horsfieldii* occurs in Kazakhstan, Kirghizstan, Turkmenia, Uzbekistan, and Tajikistan. The majority of the tortoises marketed in the United States are reported to come from Uzbekistan and Tajikistan. They are also being exported from the Russian Federation, Ukraine, Slovenia, Pakistan and Turkey. This list is somewhat misleading as each year many additional Russian tortoises are shipped into Russia from former Soviet Republics, 10,000 are sold locally in pet shops and another 25,000 are exported internationally to Western pet markets.

Türkozan et al. (2008) present an important and timely review of the international pet trade in *Testudo*. Information presented starts in 1975 when record keeping of international wildlife trafficking became required. They show that: 1) between 1975 and 2007 Russian tortoises made of nearly 50% of

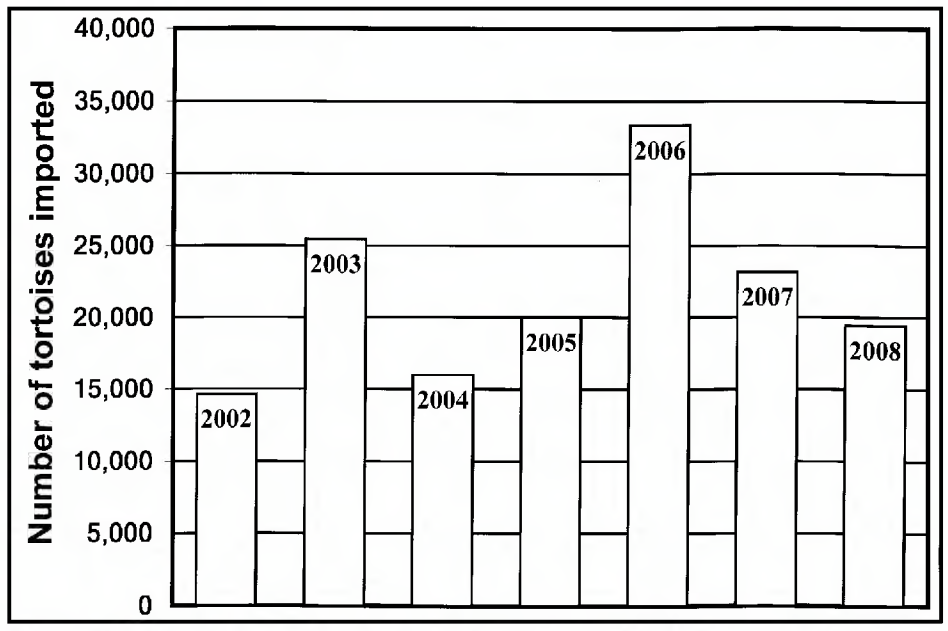

Figure 3. Numbers of Russian tortoises imported into the United States for commercial purposes (2002–2008), by year (constructed from raw USFWS data).

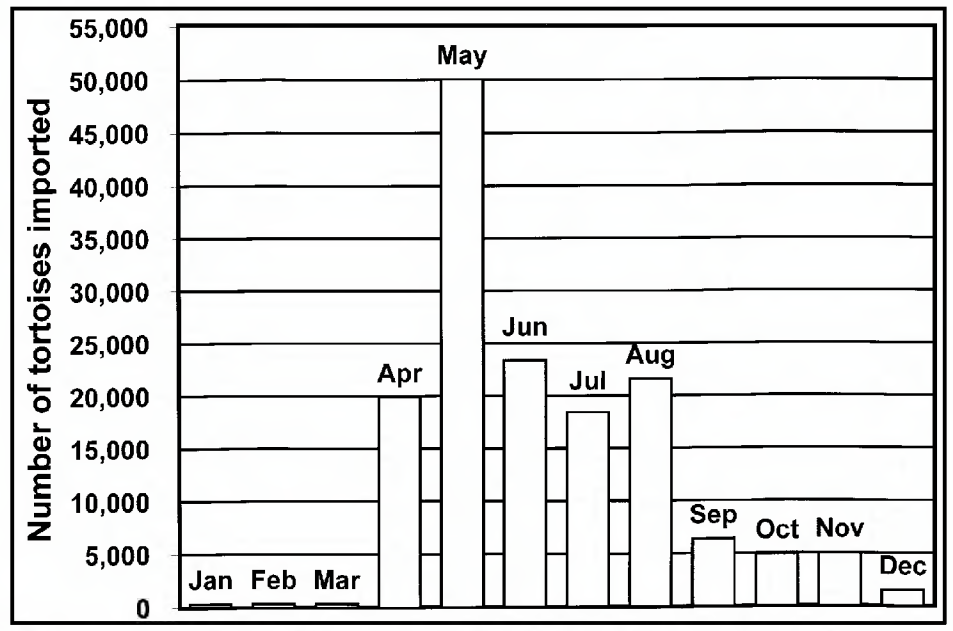

Figure 4. Numbers of Russian tortoises imported into the United States for commercial purposes (2002–2008), by month (constructed from raw USFWS data). Note that the bulk of the exportation is during and just after the tortoises' period of activity. Once in the U.S. the tortoises still need to get to the dealers and retail stores, often resulting in an additional 3- to 4-month period of living in packing box conditions.

the total trade for the genus with nearly one million individuals of this species were exported during this time period, 2) between 2000 and 2005 the number of documented Russian tortoises exported was abut 45,000 per year, 3) since 1985 the number of Russian tortoises exported per year has been increasing while other species (*T. graeca, T. hermanni*) have leveled off or declined, 4) there is nearly a threefold difference between the number of Russian tortoises documented as imports compared to the declared number of exports, 5) of the Russian tortoises exported, 40,314 (4.1%) are permitted from countries in which the species does not occur and for another 153,652 (15.6%) the country of origin is unknown, and 6) the major importing countries are Great Britain, Germany, the United States and Japan. Türkozan et al. (2008) put the number of Russian tortoises imported into the U.S. pet trade between 1975 and 2005 at 196,979. From 2006 through 2008 inclusive an additional 75,989 have been imported into this country [U.S. Fish and Wildlife Service, unpublished] (Figure 3). The earliest figures available show 91 Russian tortoises imported into the U.S. pet trade in 1970, and 22 in 1971. By the late 1980s through early '90s (1989 to mid-1994), an average of 4,048 per year were imported into this country. During the period from 1992 to 1996, 92,548 Russian tortoises were exported globally for the pet trade (Lee, 2000). While there is some variation in the way records are tallied and reported, and some of the information appears to be conflicting, it is clear that very large numbers of Russian tortoises are being exploited annually, the trend is consistent, and the numbers are gradually increasing.

Interestingly enough, one of the major exporters of Russian tortoises is a company that is a travel agency headquartered in Tajikistan. A business providing the perfect opportunity to traffic tortoises from countries with different export regulations and quotas. In Uzbekistan even the government-run zoo is in the business of exporting wild-caught tortoises. For 2010 this zoo has requested an increase in their export quota to 11,000 tortoises

Examination of the U.S. Fish and Wildlife Service (USFWS) import data shows that of 142,475 wild-caught tortoises imported between January 2002 and December 2008, five were for scientific purposes; the remainder were commercial imports. U.S. imports showed an upward trend during this period (Figure 3). Most of the imports were between April and August (Figure 4), and the predominant countries of origin were Uzbekistan and Tajikistan. Most individual shipments consisted of 1,000–2,000 tortoises but there were several shipments of 4,000 individuals. The 9,642 "captive-bred" tortoises shipped in this same time period into the U.S. from El Salvador all originated in Tajikistan. The majority of the exports to the U.S. were from just two companies in ex-Soviet Republics. Commercial importers of wildlife into the United States are required to obtain import permits from USFWS. Based on the names that appear on the permits issued during this time period, importers of Russian tortoises consisted of about ten independent reptile dealers, with LA Reptile being by far the single largest and most frequent importer. Other major importers were The Reptile Farm, Global Tropical Imports/Exports, William Brant, Two Amigos Import and Export and Burgundy Reptile Traders, each importing Russian tortoises by the thousands. In case you are wondering, the export companies are shipping the wild-caught tortoises to U.S. importers for as little as $15 each when orders are in quantities of 500 or more (November 2009 price quotes from Uzbekistan). Hoover (1998) provides an overview of the international trade of live reptiles for the U.S. pet market.

The problems are not limited to the importers. There are additional issues with our U.S. based reptile and amphibian distributors. As recently as mid-December 2009, U.S. Global Exotics, a distributor of wild-caught exotic animals that sells turtles and tortoises was raided and thousands of creatures were seized from their Arlington, Texas, warehouse. The reptiles and other animals that were confiscated were taken because of the deplorable conditions in which they were kept (Solis, 2009). While news of raid this found its way into major media outlets, anyone who has visited one of these animal supply houses, and seen firsthand the conditions under which stocks of live animals are stored, can only wonder why this does not occur more frequently and how any of them can remain in business.

Over the last several decades there has been a tremendous increase in our knowledge of tortoise husbandry, and specifically captive breeding. With this current knowledge and a

combined 1,131,334 Russian tortoises imported into the United States between 1975 and 2008, the potential for the availability of tortoises of captive-bred origin would seem high, but this is not the case. While a number of people are breeding Russian tortoises, this has had no effect on the international commercial market. This can probably be explained by 1) the relatively inexpensive nature of imported wild-caught Russian tortoises, 2) the market being largely comprised of novice individuals purchasing tortoises from chain retail pet shops, and 3) the general poor health of the imports by the time they reach the retail market. Most of these tortoises die within a year or their health is so compromised that they are not in condition to breed.

At least one of the major chain retail pet shops currently sells Russian tortoises that they claim to be captive-bred. These tortoises are being imported from El Salvador where one of the larger reptile dealers has allegedly set up a captive-breeding program. The import permits for these tortoises are all identified as captive-bred. Let's think this through; you are a business trying to make money off of captive-bred Russian tortoises. Would you choose a humid, tropical country for breeding xeric, temperate tortoises? These are tortoises that quickly succumb to various fatal respiratory diseases when exposed to humid conditions and whose physiology and reproductive cycle evolved in an ecosystem where they spend three-fourths of the year estivating and hibernating.

Natural egg incubation temperatures would be lower than the ambient temperatures at the Central American breeding facility. There is the additional issue of getting the hatchlings of a slow-growing tortoise to 10 cm (four inches), which is the minimum allowable size for commercial importation into the United States for any turtle or tortoise. Examination of these "captive-bred" tortoises shows them to all be adults. Their growth rings are, for the most part, worn smooth, and there is no indication of growth acceleration between the rings as would be expected on captive-raised hatchlings where the focus would be on quick growth to market-sized animals. But why go to the trouble even to attest that these tortoises are captive-bred? The pet shop chain in question has told their suppliers that they want to shift their stock to only captive-bred reptiles. Since 2006, over 9,600 Russian tortoises, allegedly captive-bred, have been exported from two farms in El Salvador to the United States. Each farm serves as a sole source supplier for a single distributor. If the captive-breeding program is actually successful, why are thousands of Russian tortoises continually being imported *into* El Salvador? These same exporters and distributors are also responsible for the mass importation of farm-hatched green iguanas for the retail pet shop industry.

Since 1997, a Russian tortoise ranching program has been conducted by one of the commercial exporters in Uzbekistan (Bykova et al., 2007). The program consists of the collection and artificial incubation of eggs and rearing of the young to marketable size. Eggs are obtained from captive stocks, from adult females collected and released after oviposition, and from eggs collected in the wild. The released females were marked and re-collected and produced additional clutches in subsequent years. Typically 20,000 eggs are collected annually and about 15,000 hatch (75%). The tortoises are raised for seven months prior to marketing (with about a 5% mortality). Thus, the egg and hatchling mortality is much lower than would be expected in the wild (70–90% by their calculations). Significant numbers of head-started young have been experimentally released into the wild but survivorship seems to be low, and the captive-raised tortoises are experiencing a number of heath issues. While this program seems promising, the research and information presented is by the very commercial enterprise that is raising the tortoises and supported by the republic's action plan for sustainable economic use. The majority of the tortoises exported by this company continue to be mostly wild-caught individuals (64–91%). It is interesting to note that while Bykova et al. (2007) provide information on size and weights of eggs and hatchlings and document mean, standard error and range of tortoises raised in this program, they give no indication as to the numbers of individuals in their various study groups. However, other information in their paper suggests that 2,000–11,000 captive-raised Russian tortoises go into the international pet trade annually.

While the Uzbekistan program appears promising, it is not relevant to U.S. imports and it is in no way affecting the number of wild tortoises exported annually from this republic, or helping conservation. The tortoises are grown to 6–8 cm, 2.2 cm smaller than the size required for importation into the U.S.. The entire farmed stock is sold to Japan and European countries. There are four major exporters of Russian tortoises in Uzbekistan, and each is allowed to export 27,000 wild-caught tortoises annually, with about 12,000 of these going into the U.S. pet trade. If one of the companies fails to sell all of its annual quota allotment of wild-caught tortoises, the others can then export additional shipments until the annual quota is reached. This is just the major exporters. And because bribery is an acceptable form of business in the CITES office there, the actual annual export numbers probably exceeds the 35,000 annual export quota for this one republic. The number of farmed tortoises exported has no bearing on the annual quotas of wild-caught tortoises exported.

To make matters worse, significant numbers of Russian tortoises are smuggled from Uzbekistan into neighboring Tajikistan where the export is even less regulated. Collectors in Uzbekistan say that Russian tortoises in Tajikistan are in sites where collecting is difficult and tortoise densities are low. Yet Tajikistan continues to be one of the major exporting countries for this species.

Several years back hundreds of Russian tortoises claimed to have been captive-bred appeared on the tables of various vendors at the Daytona National Reptile Breeders Expo. They were recent hatchlings and there was no question that they were not wild-caught tortoises. However, even with the same vendors exhibiting at the Expo the following three years, no additional hatchlings have been seen for sale. What apparently happened was that a significant number of animals were collected soon after emergence from hibernation and were efficiently shipped to U.S. wholesale distributors. They were then resold quickly to the reptile dealers. Many of the tortoises were gravid, laid eggs and the young hatched out just prior to the Expo. In checking the import records (USFWS), sure enough, that spring 10,000

wild-caught Russian tortoises were exported by a single supply company in Uzbekistan, and shipped through the Los Angeles airport to three major wholesale distributors in the United States.

There is of course captive breeding of this species by any number of hobbyists and a few commercial breeders in the United States, but the number produced annually pales compared to the number of imports. Perhaps the best measure of successful commercial breeding is in the annual number of imports. One would expect some sort of correlation with a downward trend in importation as an increased number of captive-bred tortoises reached the market. This has not been the case either in the U.S. or world pet trade for Russian tortoises.

In January 2009, *Reptiles* magazine ran an article on the desirability of Russian tortoises as a pets (Foose, 2009). The article tells how to keep them in captivity and implies that they are easy to maintain and make good pets. There is no mention of the endless health issues related to this species, the inhumane conditions under which they are imported, or conservation concerns regarding their mass exploitation. *Reptiles* magazine is a trade magazine for reptile hobbyist and commercial reptile dealers. They generally have little to say about the conservation issues of any of the commercially available species they promote. The general readership is basically novice to intermediate reptile keepers looking to purchase new pets. Such readers/consumers often have not yet learned how to find factual information on a species. Furthermore, the publishers of *Reptiles* inform their advertisers as to what topics articles will cover months in advance of the magazine's publication and distribution date. This in turn allows importers, distributors, and pet shops and other retail dealers the opportunity to stock up on the product prior to the release of the magazine. Attempts to work detailed conservation and ethical information into articles in *Reptiles* result simply in the deletion of the information during the editing process.

The issues are not limited to conservation. Mass importation of relatively inexpensive tortoises leads to all sorts of humanitarian problems associated with disposable pets. Because of their relatively low market value, tortoises captured by collectors often sit for weeks or months stacked in crates or crowded into bags before they are picked up and delivered to the exporters. The tortoises then await sales, price negotiations, payment, and the clearing of wire transfers and paperwork prior to overseas shipment. Once the tortoises arrive in the United States the process starts anew with the tortoises awaiting advertisement, distribution to wholesalers and retailers and eventually to buyers. Minimally the entire process takes months with the tortoises housed in cramped unsanitary containers, shipping boxes, and aquariums in pet shop showrooms. The inhumane treatment of Russian tortoises is not limited to our modern-day pet trade era. In the early 20th century tortoises were shipped from central Asia to St. Petersburg by rail and shipping took 3 to 9 months. They arrived alive and were reported to be "healthy" (Nikolsky, 1915).

The extended period of time from collection to purchase by the eventual pet owner, of course, takes its toll on the tortoises; Between 5% and 25% of the tortoises die during shipping (Kuzmin, 2002). Most individuals seen in pet shops have all sorts of obvious respiratory and eye disorders, support heavy internal parasite loads, and have been exposed to countless pathogens during their prolonged, crowded journeys to retail markets. The mortality rate is exceptionally high and many tortoises, even when given extensive veterinary care, many still fail to survive. Vasiljev (1999) provides information on the many diseases of captive Russian tortoises. These disposable pets are typically sold with no information on their basic care for the retailer or the purchaser, and most people even if they are able to tell that the animal is sick are unwilling to spend hundreds of dollars on veterinary work for a $70 tortoise. At one reptile show in the Carolinas, a dealer had a hundred or so Russian tortoises in a box. The tortoises were stacked 3–4 deep, which raised the obvious question as how does he keep them when they are not out on display. The true meaning of a disposable tortoise hit home last summer. We attended an annual 4th of July turtle race in Belair, Maryland. Along with the 100 or so box turtles that had been gathered up for the race there was one rather unhealthy male Russian tortoise. A parent had purchased him that week so that her son would have a "turtle" to enter in the race. We asked what they planned to do with the tortoise once the race was over. They actually had not thought about that, but they suspected they would just release it. We wonder what new strains of bacterial and viral disorders were spread among the local box turtles as a result of being confined with the tortoise prior to the race.

One of us (KS) oversees a turtle and tortoise rescue/adoption group in the Baltimore area. Although only a handful of Russian tortoises show up for adoption each year, most are surrendered because they are *too* active! Keepers often try to house Russian tortoises in small indoor enclosures (mimicking the set-up displayed in local pet shops where they were purchased), yet these active tortoises end up creating considerable noise as they attempt to burrow or escape their enclosures and create microhabitats in their environment.

Those that are surrendered often suffer from a host of health issues related to improper husbandry. Most recently, two males were surrendered by a keeper who had purchased both tortoises as wild-caught subadults from a chain pet store six years earlier. Although the owner took his tortoises to a veterinarian every year and tried to do what was best for the animals, the tortoises arrived with overgrown beaks and nutritional deficiencies. The veterinarian was not experienced with reptiles, and in addition to failing to realize that the beaks were overgrown, he failed to recommend a more qualified veterinarian to the owner, even though there are several excellent chelonian veterinarians in Maryland. The Russian tortoises were kept on a rabbit pellet substrate, which is too dry, can be damaging to leg and foot joints, and prevents digging—a natural behavior. To make matters worse, the tortoises lived in an eight-foot-square space with a female Russian tortoise. This small space made it difficult, if not impossible, for proper thermoregulation and the burrow microhabitats that tortoises create in their natural environments.

When an experienced reptile veterinarian used a Dremel tool to file down the beaks, the beaks were extremely soft and offered little resistance against the Dremel tool. The tortoises had

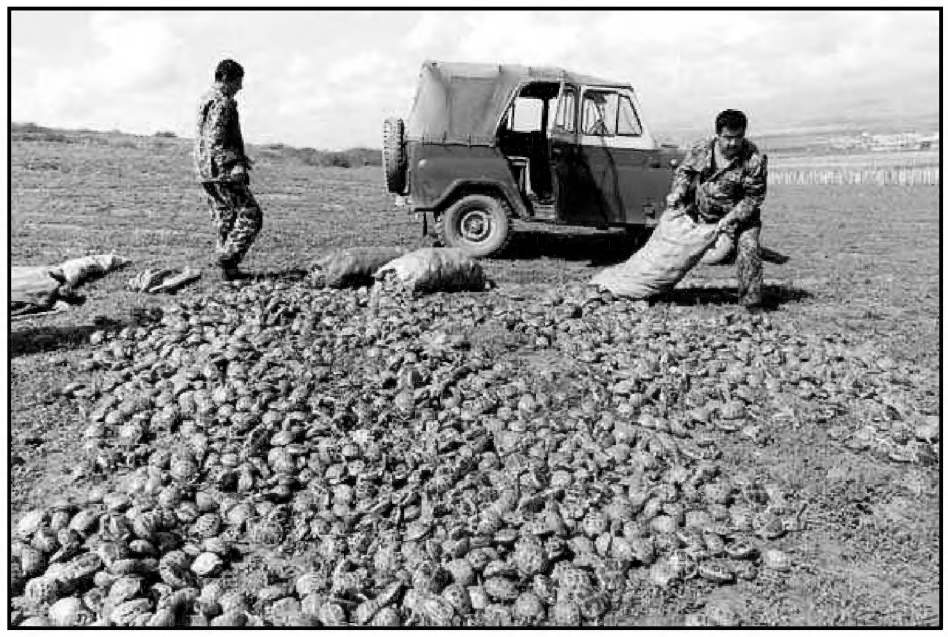

Figure 5. Russian tortoise confiscation.

dry, flaky skin, and had been treated repeatedly for eye infections that were likely simply the symptom of an inappropriate habitat and substrate. Sadly, this scenario is all too common. Even when keepers try to do the right thing, misinformation abounds and the animals suffer for it. Typically people duplicate the housing they see for these tortoises when the tortoises are purchased in pet shops—a 30-gallon aquarium with wood shavings, and a half dozen or more adult tortoises with no shelters, basking lights or water. Often in the pet shops the tortoises share their space with three-toed box turtles, which can result in cross-contamination of parasites, viruses, and other potential diseases between the two species.

Wild-caught Russians may also pose a threat to native North American herpetofauna. In the summer of 2008, an adult Russian tortoise was found wandering the woods of the C&O Canal State Park in Maryland, and a number of them have been found in various places in North Carolina. They are obviously released pets. In addition to the intestinal parasites and lungworms often seen in imported Russian tortoises, they've been known to carry a chelonian version of the herpes virus that has recently been found in native box turtle populations (Marschang, 1999). Considering that keepers report successful hibernation of their Russian tortoises in areas of the mid-Atlantic, this species is able to survive year-round in Western Hemisphere habitats and potentially pass on pathogens to domestic box turtle populations, and in portions of the country, to our native tortoise populations (Pasmans et al., 2008).

During the 15 years the Tortoise Reserve has been in existence we have been given dozens of orphaned Russian tortoises. They do well here in outdoor pens, hibernating from late October through mid-March and they are generally inactive throughout the heat of the summer. Health issues often arise when new individuals are introduced in with the established stock. Despite several months of isolation and quarantine, apparently healthy tortoises carry various pathogens to which they are immune but other tortoises are not. It is not clear if these are diseases they have picked up during captivity or if wild tortoises from various portions of their range have immunity to different pathogens. The only solution has been to not introduce new animals to established groups. This does not seem to be a major issue with other species of tortoises.

Do people only care about the wildlife indigenous to our own country or state? Why is it acceptable for U.S. based businesses to create markets and exploit the wildlife from other nations? While this concern is not limited to Russian tortoises, this tortoise is the poster child of commercial exploitation by the pet trade. The problem is not just the importers, distributors, retailers and advertisers (both the Internet and trade magazines); it's also the uninformed public. We can all love our pet turtles and tortoises, but are we loving them into extinction? We are incensed at the slaughter of whales and the killing of mountain gorillas so their hands can be made into ash trays and sold to tourists. Yet, the purchase of a 30- to 50-year-old tortoise snatched from the wild is OK? What about 20,000 of just this one species per year coming to the U.S.? How important is it to purchase a wild-caught Russian tortoise? Do possession and ownership outweigh moral fiber? Are the profit margins of chain pet stores, businesses that care about homeless cats, heartworms in our dogs, and promote "adoption first," so narrow that they are willing to seriously deplete populations of wild tortoises? Who is it that is actually willing to support a marginally legal group of reptile exporters, importers, distributors and dealers at the expense of wild populations? Apparently quite a few people: sometimes as many as 30,000 in a single year just in the United States. A survey of pet shops in Texas showed Russian tortoises to be one of the top three species of chelonians sold as pets in that state (Ceballos and Fitzgerald, 2004). At the same time state wildlife regulations typically only protect native species and they have no jurisdiction over the trade in exotic reptiles within their states.

These tortoises did not survive the hardships of the Great Steppes of Russia and reach maturity to be made into short-term disposable household pets for children. There is something seriously wrong when the tortoise with one of the widest distributions of any species of tortoise in the world, living primarily in sparsely populated areas, becomes listed as Vulnerable by the IUCN Red Book (Hilton-Taylor, 2000). The Vulnerable category is based on a predicted loss of 25% of the total wild population in 10 years or less.

What can you do about it?

Less than five years ago, representatives of the Tortoise Reserve, the World Chelonian Trust, and the Mid-Atlantic Turtle and Tortoise Society met with regional managers of a national chain pet store to persuade them to stop the sale of wild-caught Russian tortoises. The managers made it clear that they would continued to sell wild-caught tortoises and turtles because other stores in the country also sold wild-caught animals, and they saw no need to stop this practice so long as their competitors were doing the same thing. The lesson? The sale of wild-caught animals is based on consumer driven economics. By continuing to purchase wild-caught animals, either intentionally or through a lack of knowledge, we are contributing to the destruction and inhumane treatment of this species.

Do your research thoroughly before getting a pet. Learn what the market holds, and talk to more than just one source. A seller is trying to make a sale – visit other sources of information before considering the purchase of a tortoise. Ask for copies of CITES permits to insure, at least, that the tortoises

were imported legally and identified as captive-bred.

Avoid dealers and pet shops that sell wild-caught animals to the general public. Don't subscribe to trade magazines that promote or advertise the sale of wild-caught reptiles.

Never buy a wild-caught animal to "rescue" it. You are only rewarding the seller, who may use part of the profit to obtain more wild-caught animals to sell. Be proactive in other ways to prevent the future sale of wild-caught tortoises. You'll save many more animals this way.

Boycott reptile trade shows that allow the sales of wild-caught reptiles. Write to the organizers and ask them to ban the sale of wild-caught animals to the general public.

Talk to the managers and owners of local pet shops – let them know why you are boycotting. Ask them to provide captive-bred alternatives. If this meets with resistance, consider writing an editorial piece to your local newspaper explaining why you are taking your money elsewhere. Write to the corporate headquarters of chain stores that sell wild-caught animals or that misrepresent the requirements of the animals they are selling.

Call and write letters to corporations and magazines that continue to exploit wild-caught tortoises and other reptiles. The website www.planetfeedback can help with sending a letter to various corporations, and let others see that they are not alone in their concern. Ask your local turtle and tortoise clubs and other reptile groups to do the same.

Support stronger import regulations and stricter enforcement of CITES regulations. It is time for Russian tortoises to be elevated to a CITES I species. Encourage state wildlife agencies to add regulations overseeing non-native species.

Spread the word! Make copies of this and similar articles to distribute to members of local turtle clubs, pet shops, and at reptile trade shows and pet expos. If someone admires your animal(s), make them aware of the wild-caught trade and how to avoid purchasing a wild-caught pet.

Promote captive breeding and, if purchasing a pet reptile, purchase only from dealers that sell exclusively captive-bred animals.

It's interesting to dissect the problem. If you set aside all the greedy middlemen, promotional magazines, internet reptile sales, and pet shops profiting from sales of inappropriate housing and food products for the tortoises (aquariums, substrates, lighting, water dishes, turtle eye drops, and canned tortoise treats) and look at all this from just the endpoints—the buyer and the tortoise collectors of central Asia—it's a strange scenario. The retail purchase, made by a person who loves animals and obviously really likes tortoises, and the collectors who need to protect their resource, have the real investment. They are the two groups that actually should have control over the marketing of the tortoises, and the most interest in their overall long-term welfare. In truth the middlemen drive the market, as they are calling the shots and controlling the exploitation. The history of mankind is a history of exploitation of natural resources. Whether it's mining, overfishing, overhunting, overgrazing, the lumber industry, or water use, we seem incapable of self-regulation and understanding the basics of good stewardship. And what of all our agencies and international agreements and treaties that are responsible for overseeing the misuse of wildlife? By law they have the powers for protection and regulation of the trafficking of tortoises and other species. Yet, their powers are so entrenched in the agencies directing them that the concerned public no longer has a voice in any of this, while a few people continue to profit from a small tortoise that has absolutely no say in its future.

Enjoy listening to your child's wild-caught Russian tortoises as they bang about in living room aquariums, and ponder the thought that they do not quite understand where they are, the aspects of global shipping, the value of the American dollar in Turkmenistan, or the concept of glass walls. They are just trying to get back home.

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Review: *Giant Constrictors: Biological and Management Profiles and an Establishment Risk Assessment for Nine Large Species of Pythons, Anacondas, and the Boa Constrictor* by Robert N. Reed and Gordon H. Rodda 2009. U.S. Geological Survey Open-File Report 2009-1202, xviii + 302 pp.

David G. Barker and Tracy M. Barker
vpi@beecreek.net

Summary

Burmese Pythons may eat Ivory-billed Woodpeckers. As surprising as that statement may seem, it's listed as a genuine possibility in Table 4.2 on page 69 of this report. There is no better illustration of the extraordinary degree of bias and unfounded speculation that comprises the bulk of this report. We make the following observations to summarize this report:

• A search of the manuscript for 11 grammatical qualifiers, including *may*, *might*, *maybe*, *could*, *appears to*, and others, found a total of 1369 uses. More than one in every hundred words is a qualifier. On average there are 5.3 qualifiers per page.

• The maps indicating areas in the USA favorable to the establishment of each taxon are based on climate and, in some cases, precipitation. They do not consider the habitat, plant communities, niches, human density, mechanized agriculture, predators, prey, road density and traffic, suitable shelter, surface water, soil, or any other of many factors that have strong effect on the potential and realistic "suitability" of these areas for the actual establishment of any of these species. It is our opinion that most of the areas indicated in the report as having favorable climates, in fact, have little or no actual possibility to realistically or actually support populations of any of these large constrictors. The authors stop short of stating that Anacondas could survive in South Texas, or that Burmese Pythons could live in Oklahoma or Utah, but they strongly suggest these are "possibilities." In fact, because of their excessive use of qualifying terms, the authors make few definitive statements about anything.

• This is a state issue, not a national issue. The presence of Burmese Pythons in Florida and the possibility of the establishment of the other species covered in this report is a Florida issue. The state of Florida has excellent progressive and proactive regulations and programs in place.

• The establishment risk assessments performed by the authors for each of the nine taxa in this report conclude that in all categories the nine taxa have either a "medium" or "high" risk that they will become established. In other words, they conclude that a 100-pound, 15-foot-long snake has the same likelihood to become established as, say, a small generalist sparrow species or a rat. This begs disbelief.

• It would be improper to base legislation of any sort on this report. This report is not impartial, nor are the authors and the department that employs them, the Invasive Species Program of United States Geological Survey. If such a report is deemed necessary, it should be compiled by an impartial panel of scientists.

Quotes with Annotated Comments

Below we list a series of quotes taken from the manuscript, each annotated with our comments in brackets. This seemed to us the best way to illustrate the extraordinary number of presumptions and speculations that liberally riddle this manuscript. We do recognize the unfairness of isolating citations out of context; therefore we list the exact location in the manuscript of each of our excerpts so that a reader can go to the page to better understand the context. We start with this citation from the beginning paragraph of the manuscript:

> "The occurrence of these three large constrictors [referring to Burmese Pythons, Northern African Pythons, and Boa Constrictors] in the wild in the same area of Florida may be a coincidence, but southern Florida has a climate that may be suitable for all of the giant constrictors and much of the commercial trade in giant constrictors passes through southern Florida." (Page 1; paragraph 1)

[Coincidence? Isn't it more likely that South Florida has the only suitable conditions in the United States for any of the nine species considered in this report? The climate of South Florida is not truly tropical, but it is the closest thing to it in the continental USA. Perhaps more important, the 1.5-million acres of the Everglades National Park provide a unique swampy refugium that is unpeopled and protected. There is no other place in the United States even remotely similar. However, climate is only one of many factors necessary for any of these species to become established. The problem of established exotic constrictors is a Florida issue, and there is no evidence that in the future this will ever be anything more than a Florida problem. HSUS, USGS invasive-snake biologists, and a few other environmental biologists and animal-rights organizations are trying to convince the public that this is a national issue—coincidentally, they all stand to benefit if their efforts result in a national law.]

> "This document addresses primarily the biological impacts associated with potential colonization of the United States by any of the nine giant constrictors. . . ." (Page 2; paragraph 4)

[This sounds a lot like the entirety of the United States is in danger of colonization by giant constrictors. In fact, it goes on to mention that the purpose of this paper is to "tabulate biological information germane to potential social and economic impacts."(?) They go on to say that this paper does not "consider or assess the diverse regulatory actions that might be taken to mitigate or prevent colonization by these animals." They then go on for another 258 pages implying, suggesting, and predicting that giant constrictors would do just fine in selected areas of the United States, and that in those areas, life as we know it will

be drastically altered if nothing is done to stop this impending invasion.]

> "Risk assessment, by its very nature, entails uncertainty. . . . We have tried to draw attention to the greatest sources of uncertainty, but all elements of a risk assessment embody some uncertainty." (Page 3; paragraph 2)

[This citation could be also be written to say "The very uncertainty of risk assessment allows it to be manipulated to make any statement that is desired." This is particularly true when there is 1) uncertainty of the process (methodology), 2) uncertainty of the assessor (human error), 3) uncertainty about the organism (biological and environmental unknowns)." Those three factors are identified in Chapter 1 as the three primary factors leading to "uncertainty". Perhaps coincidentally, all three factors are either uncertain or unknown for every species covered by this paper. We wonder why, in the absence of sufficient quantifiable data, these risk analyses were even attempted.]

> "A word on terminology—a variety of terms has been used to describe an organism that is not native to the place in which it is found: exotic, introduced, invasive, nonindigenous, non-native, colonists. In this report we make no distinction among these terms." (Page 4; paragraph 2)

[We find this curious, since most ecology and invasion biology texts draw a clear distinction between the term "invasive" and the others listed. In fact, an "invasive species" is legally defined in the National Invasive Species Act as "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. With this qualifying statement, the authors give themselves free rein to identify these nine species as "invasive," arbitrarily granting them a more damaging and dangerous status.]

> "All of the species under consideration can probably move large distances over short periods when so inclined. These two factors combine to make it hard to limit the spread of their colonies." (Page 6; paragraph 2)

[This is biased speculation and a misleading statement. A "large" distance compared to what—the migration of the dog flea? A "short" time compared to what—the lifespan of a mayfly? We would request that the authors here provide even one citation regarding the mobility or migration of the Beni Anaconda or the South African Python—or any one of the others. Radio tracking in the Everglades has shown that several displaced Burmese Pythons returned several miles to their original location, but that falls somewhat short of them packing up and crawling to Georgia. Take note of the qualifier "probably" used in the first sentence—more on that later. The only fact in the matter of migration is that in the 30 or so years that boas and Burmese Pythons have resided in South Florida, there has not been any "spread of their colonies."]

> "The core of this work—the biological profiles—are a work of traditional library scholarship, . . . " (Page 9; paragraph 1)

[The biological profiles in this paper are based on an assorted compilation of references of varying value, relevance, and importance. The 37 pages of References Cited at the end of the paper will be a valuable resource for future writers and researchers. However, the core of the paper is better described as a carefully crafted thesis of speculation and presumption that takes every opportunity to propose all possible terrible *possibilities* that *might* happen *if* any of these species did someday survive in an isolated population somewhere in the United States.]

> "Knowledge of the biology of these giant constrictors may be scanty, but knowledge of appropriate management tools for these species is almost nonexistent. Thus for the management profiles we relied to varying degrees on inference from the management of other snake species, primarily the Brown Treesnake in Guam and the Habu in the Ryukyu Islands. . . . " (Page 9; paragraph 3)

[Sure, that's science for you—since there is absolutely no applicable knowledge, then turn to the unsuccessful managements attempts of two snake species that are only distantly related to pythons, snake species that are completely different physically, physiologically, ecologically and geographically. Again, why was any of this even set to paper?]

> "We obtained CITES records of imports to the United States from 1977 through 2007 for the species of interest; results are presented in the Appendix and include records of over 1,100,000 individuals of these species imported to the United States during this period." (Page 14; paragraph 4)

[Table A-1, page 302 in the Appendix, indicates that in that 30-year period, 618, 872 Boa Constrictors were imported, followed by Burmese Pythons (297,443), Reticulated Pythons (147,485), North African Pythons (32,728), Green Anacondas (13,262), with Yellow Anacondas trailing at 1,968. There is no record of South African Pythons, Beni Anacondas or DeShaunsee's Anacondas being imported and we are not aware of living specimens in the United States at this time. We would emphasize that these animals all were legally imported into the United States, legally purchased by Americans, and many of these animals and their descendants are currently living in the United States as the private property of American citizens. The numbers of Boa Constrictors, Burmese Pythons, and Reticulated Pythons total 1,063,800 animals or 95.7% of the total imports. Because of the emphasis placed on captive breeding, it is likely that the number of these animals currently living in the USA exceed the original imports.]

> "In 14.4 radiotelemetered python-years, we are aware of only four detections [of Burmese Pythons] unaided by use of the radio signal (S. Snow, pers commun., 2008). During the radiotracking period, there were visitors and searchers in a position to see pythons in the area every day. Despite this human presence, the average python was detected by searchers or the public about once per three years (4/5,270 days or 1/1,318 days). This implies that on any given day the probability of anyone finding an arbitrary python without the assistance of radiotelemetry is only one out of 1,318 days or 0.001 or 0.1 percent." (Page 26; paragraph 1)

[Four snakes were seen in 5,270 man-days of searching—this is definitely going to be a problem for the tourists who come to the Everglades specifically to see a python. Not to nitpick, but the actual probability of seeing a python is even less than .1%, closer to 0.076%.]

> "Whereas some of the pythons were undetected because no one was searching for them, and a few others were near a searcher but undetected due to obscuring vegetation, the vast majority of non-detections occurred simply because pythons rarely visit levees, roads or road berms, trails, or other locations frequented by humans (Mazzotti and others, unpub. data, 2009). In most cases a python went undetected simply because it was too far from any dry land or open water to be seen by an observer walking, driving, or boating." (Page 26; paragraph 1)

[What? Some pythons were undetected because no one was

searching for them? And how would anyone know if "the vast majority of nondetections" occurred because they were too far from dry land or open water? Maybe there aren't very many.]

> "The relative difficulty of detecting giant pythons has vital implications for controlling the population using either trained searchers or volunteers." (Page 28; paragraph 1)

[So "giant" pythons are harder to find that just regular pythons? Based on the data presented here, it seems there is no point to attempt searching.]

> ". . . searching for dangerous snakes in a swamp at night has fewer steadfast devotees." (Page 30; paragraph 1)

[Just how many volunteers have been harmed while searching for pythons and boas by those pythons and boas to warrant that these snakes are here designated as "dangerous"? This is baseless slander directed purposely at pythons and boas. In fact, we suspect it is the alligators, crocodiles, cottonmouths, diamondback rattlesnakes, feral hogs, and skunks that present most of any nocturnal dangers.]

> ". . . giant constrictors are potentially dangerous to hunters, and misidentification of snake species in the southern United States can lead to fatalities." (Page 30; paragraph 3)

[What? Does "misidentification" mean that volunteers searching for giant snakes might be confused by venomous cottonmouths and grab them? Or does this mean that volunteers might be fatally grabbed by the giant snakes that they are searching for? Or does it mean that hunters might misidentify native snakes as being pythons or boas and fatally shoot them?]

> "However the low detectability of giant constrictor snakes in heavily vegetated environments (especially in the southeastern United States) probably precludes use of this tool [searching] for eradication." (Page 30; paragraph 4)

[We start to notice a pattern of always referring to "giant constrictors" and "giant snakes" instead of pythons and boas. This is using a loaded term for effect. We prefer to think of them as the "great constrictors," in the same manner to which the great cats, and great apes are identified. The fact is that most boas and pythons that are encountered in nature are not of "giant" proportions—they are just regular small to medium-sized snakes. In the example of Burmese Pythons, first there is only a 0.076% chance of seeing one at all, and then the chances that it is a large specimen are also small.]

> "A key consideration for traps is that giant constrictors appear to be primarily sit-and-wait or ambush foragers. . . . " (Page 31; paragraph 2)

[It goes on to explain that traps don't work and it is pointless to use them. Nevertheless, money has been spent to place traps in numerous locations in the Everglades and in the Crocodile Lake Wildlife Refuge on Key Largo.]

> "A likely drawback to sniffer dog detection of giant constrictors is that the dogs, which are remarkably expensive to train and maintain, could be killed by their targets." (Page 32; paragraph 2)

[Is this different than the dangers faced by bear dogs, hog dogs, lion dogs, drug dogs, or police dogs? Sniffer dogs have even been used in the efforts to control the venomous habu (Shiroma and Ukuta, 1999). Considering that Python Pete, the well-trained python sniffer beagle with his own website has yet to find a python after three or four years, apparently the danger to a sniffer dog is probably not all that great.]

> "Given the various restrictions on access inherent in the complex wetlands of southern Florida, it is difficult to see how a bounty could be raised to a high enough level to stimulate hunting of rare giant constrictor snakes in all suitable habitat." (Page 38; paragraph 2)
>
> ". . . one risks creating a perverse incentive for hunters to both distribute the pest to new areas. . . . " (Page 38; paragraph 3)

[Not only will most hunters not be motivated by bounties, but the hunters that are motivated may also be motivated to release pythons and boas in new areas. It's a pretty low opinion of the hunters and volunteers who are working with the program.]

> "We are not aware of any documented power line problems from the large population of Burmese Pythons in south Florida, and thus this problem may be no more severe than that already associated with power line movements by rat snakes." (Page 66; paragraph 4)

[When volunteers and researchers are searching, a python is spotted every 1,318 man-days of effort, but it's a "large" population.]

> ". . . hunting is an economically important activity further north, one that is potentially adversely impacted by a stealthy predator that competes with hunters by eating desired species such as quail, turkey, feral hogs, and deer." (Page 67; paragraph 5)

[Would hunting not be affected by a loud noisy predator? Pythons are stealthy, no doubt, but can't this be said of panthers, bobcats, foxes, coyotes, mink, feral cats and just about all vertebrate predators? Isn't it a good thing if Burmese Pythons happen to eat feral hogs, the animal determined by many to be the most destructive invasive species in the United States?]

> "Regulatory measures to restrict trade or ownership could have negative ecological effects in terms of dealers freeing stock (the release of multiple animals at the same time and same place enormously increases the risk over single releases such as those typically done by pet owners), owners releasing animals for which they don't have or cannot acquire appropriate licenses, and ecovandals determined to release animals as a imprecisely directed assault on the government." (Page 74; paragraph 1)

[It appears to us that there is a strong possibility that "ecovandals" are already at work releasing Northern African Pythons in South Florida in order to support their inclusion on H.R. 2811 and S. 373. We find it beyond coincidence that the day after the first House committee hearing for H.R. 2811 in August 2009, in which it was decided to add *Python sebae* to that bill, there was a news release that two specimens of *Python sebae* were found in South Florida. In the months that followed, there have been numerous specimens and reports of specimens in South Florida, yet prior to that Congressional hearing, not a peep was heard about Northern African Pythons invading Florida. Now the talk is that the species has long been established in South Florida. Yet Snow et al. (2007) made only passing reference to the species being reported. There is even speculation in that paper that Green Anacondas and Reticulated Pythons might become feral in South Florida, but no mention of that possibility for *Python sebae*. Is it possible that in 30 years of monitoring the "Burmese Python problem" that no one noticed an even bigger species out there prowling in the Everglades? We cannot help but suspect that foul dealings have been orchestrated to lend credence to this unnecessary and ill-advised bill.]

"Within this vast distribution, Northern African Pythons . . . range from the coasts of Kenya and Tanzania across much of central Africa to Mali and Mauritania, as well as north to Ethiopia and Eritrea; . . . " (Page 109; paragraph 3)

[The range of the Northern African Python is centered on the equator. It is a truly equatorial tropical species that ranges from about 17 degrees north latitude to about 12 degrees south latitude. So far as we are able to determine, all imported specimens since the 1990s have come from West Africa at 7–10 degrees north latitude—most or all exported from Ghana, Togo and Benin. There is no climate and no ecosystem in the United States that is even remotely similar to the environment in the natural range of the particular *Python sebae* that have been imported into the United States. The fact that Reed and Rodda are able to perform a "risk analysis" that would indicate otherwise should be taken as evidence of the flexible nature of the outcome of any such analyses.]

"The fertility and long-term viability of such hybrids [between Burmese Pythons and Northern African Pythons] is unexplored. It is conceivable that introduction of African genes to the Indian Python population could result in increased genetic variability that could allow exploitation of new ecological or physiological niches and/or result in some other type of hybrid vigor. Such a scenario has become more likely in the face of recent evidence for a population of Northern African Pythons along the western edge of Miami, an area within the introduced range of Indian (Burmese) Pythons." (Page 137; paragraph 2)

[We are astounded that any scientist would publish such wild speculation. It's like a movie script—what if the Alien bred with the Predator—then with all the fury its hybrid vigor could muster, the Predlien preyed on the human population with doubled vengeance. Do the authors really think this is this a conceivable scenario for pythons? Still, press releases about the dangers of hybrid pythons have been rampant in the media in the past month—nothing like stirring up a little public hysteria, all in the name of getting this bill passed. We are aware of at least 20 different hybrid crosses of python species that have been made in captivity. The fact is that most hybrid pythons that have been observed show low viability, low fecundity, and, in some cases, sterility. The problems of some hybrids become more pronounced in successive generations.]

"The presence of a novel predator on rare birds is likely to be detrimental to bird watching tourism if pythons reduce populations and thus reduce sighting rates." (Page 139; paragraph 3)

[The failure of USGS invasive-snake biologists to protect the birds of Guam has no doubt left them with the impression that the bird population will suffer with the introduction of any exotic snake species. However, unlike in Guam, there are no bird species in the Everglades that are naïve to snake predation. From what we can sift from this manuscript, it's equally possible that by increasing predation on raccoons and especially on feral cats, pythons may improve hatching successes and increase the bird population.]

"Presence of such species in natural landscapes might also induce employers to institute measures such as are used in bear country, including special training, requirements for safety equipment, and/or requirements to travel in pairs in predator-occupied habitat." (Page 139; paragraph 4)

[We were on the floor laughing with this one. It's OK if employers in South Florida send their employees out to face 1000-pound alligators, crocodiles, cottonmouths, diamondback rattlesnakes, bears, feral hogs, and rabid skunks, but they better be careful and institute special safety procedures in case an employee should bump into a harmless snake that is commonly kept as a pet by teenage kids. We recommend that when walking around, all nervous USGS biologists and Park Service employees wear bells on their shoes, blow continuously on snake charmer flutes, and carry stun guns.]

"It is possible that pythons would suppress populations of rats or other crop pests in agricultural settings." (Page 139; paragraph 4)

[How did this slip in here? A feral python might actually have a beneficial affect on agriculture? Burmese Pythons are known to eat feral cats and they might eat feral hogs, too. However, this statement follows the musings of Reed and Rodda that Northern African Pythons might negatively impact hunting because they are known to eat ungulates that are considered trophy game species in their native habitat; if they become established in Florida they might eat deer and exotic trophy ungulates. In other words, to import and establish exotic ungulates in Florida is apparently a good practice that is encouraged and supported by game biologists, but those good feelings and that support are not extended to reptiles, especially if those exotic reptiles might eat the exotic ungulates.]

"As with most giant constrictors, the maximum size of the Boa Constrictor has been subject to exaggeration, especially in the older literature. Unfortunately, many of these claims of gigantic boas have been perpetuated by more recent authors. . . . Part of the confusion stems from misapplication of the name Boa Constrictor to other giant snakes, including anacondas and even some Old World pythons." (Page 148; paragraph 3)

[That is correct. The Boa Constrictor with the scientific name of *Boa constrictor* is not considered a "giant" snake species. In fact, most are on the small end of the snakes that are considered to be medium-sized.]

"The Boa Constrictor has established more introduced populations than any other boa or python species of which we are aware, with at least three known populations." (Page 158: paragraph 5)

[Three? Why that's nearly world domination. Let's see, they have become established on Aruba (a narrow tropical island about 21 miles long, located at 12 degrees, 30 minutes, north latitude, situated about 20 miles offshore from the South American mainland and the natural range of boas). Boa Constrictors also have become established in Cozumel (a tropical island, 30 miles by about 10 miles, located at 20 degrees, 30 minutes, north latitude, situated about 12 miles east of the Yucatan Peninsula of Mexico and the natural range of boas. Really, the only surprise about these two populations of Boa Constrictors is that they weren't there already. Of course, there is the small beachhead population located in South Miami in the Deering Estate, a Miami park. This population is located at about 25 degrees, 30 minutes, north latitude, a long ways away from any natural populations of Boa Constrictors. The Deering Estate is 444 acres in size, but Boa Constrictors are usually observed in a small area within the park. In the nearly 40 years that the population has been observed, it has not significantly expanded its numbers or territory. It is not reported to have committed any sort of havoc in the native ecosystems. Of course, the environ-

ment of Miami and of South Florida in general cannot in any sense be considered to be a natural ecosystem.]

> " . . . at least seven *B. constrictor* specimens currently held in museums in the United States were found among bananas shipped from Central America or Mexico. . . . " (Page 158; paragraph 5)

[Are these records from the 1950s and before? We have read that modern banana shipping methods have eliminated hitchhiking tarantulas, pitvipers, and Boa Constrictors. If that is not so, then perhaps it would be prudent to ban imports of bananas.]

> "Ninety-six individuals [Boa Constrictors] were captured between 1989 and 2005. . . . However, most (around 70 percent) of the Deering snakes were found in 1996, when at least two females must have given birth in the park. (Page 159; paragraph 1)

> "Snow and others . . . suggested that the invasive population at the Deering Estate at Cutler may be limited by climate, and that reproduction may be successful only during years with especially warm winters, such as occurred in 1996; they support this idea by saying that the boas appear to be of northern South American stock and thus unlikely to be adapted to cooler temperatures." (Page 160; paragraph 6)

[We agree. The boas at the Deering Estate are a struggling population. Ignoring the babies of 1996, an average of less than two boas a year were observed. Boa Constrictors will not thrive in feral populations in the United States outside of South Florida for a variety of reasons; even this population in what seems like prime real estate is not doing well.]

> " . . . we are unaware of any verified fatal attacks of a Boa Constrictor on a human being." (Page 173; paragraph 4)

[To repeat—there are no verifiable accounts of a fatal attack by a Boa Constrictor on a person of any size or age. For that matter, there are no published reports of serious injury, either.]

> "United States importation records for the period 1989-2000 totaled 115,131 individuals, a sum that was second only to Ball Pythons (*Python regius*: 366,808 individuals) among 24 species of boid/pythonid snakes imported. . . . " (Page 174; paragraph 3)

[These figures are from Reed (2005) and they are from the LEMIS data base, not the CITES data. Unfortunately, Reed (2005) got the math wrong. See Barker and Barker (2008b) for a thorough review of Reed (2005). Now Reed and Rodda have the math wrong. According to the data presented in this paper in Table A-1 in the Appendix, from 1989 to 2000 a total of 288,833 boas were imported, more than double the figure reported here.]

> "In the public mind, Boa Constrictors are considered a giant snake, but they are not particularly large in comparison to some of the true giants." (Page 176; paragraph 5)

[Regardless of what is in the "public mind," the Boa Constrictor is not by any measure a "giant snake" and it does not belong in this paper. The Boa Constrictor is one of the most common snake captives in the world, and because it is a highly desired pet with many unusual color and pattern variations, it is the most valuable snake species in the world. There are at least a half million Boa Constrictors in captivity in the USA, and that number may be closer to one million.]

> "When localities of Argentine boas are removed, however, the suitable area is much smaller and includes peninsular Florida south of about Orlando and extreme south Texas, as well as parts of Hawaii and Puerto Rico." (Page 177; paragraph 2)

[The darkly pigmented Argentine Boa is listed as a CITES I Endangered species. However, captive-bred animals are classified as CITES II and can be imported, exported and entered into commercial transactions. The range of Argentine boas extend south in north-central Argentina to about 29 degrees south latitude. In the southern reaches of the range this taxon is seasonally active, taking shelter in the coldest parts of the winter. They are unlike any of the other geographic races of Boa Constrictors, and including them in the risk analyses for the generic Boa Constrictor certainly does expand the potential suitable climate for the species. Argentine Boas constitute a small percentage of the US captive population of Boa Constrictors. While they are undoubtedly better adapted to more climatic regions in this country, it seems doubtful that they would establish anywhere beyond the hypothesized range of other races of Boa Constrictors, if at all, because of other environmental and human factors. The bottom line is that there are no established extralimital colonies of Argentine boas anywhere in the world.]

> "The introduced population [of Boa Constrictors] in south Florida has not dispersed widely over the past three decades, but it is unknown whether this is due to unsuitable surrounding habitat, whether we are currently observing the preexpansion lag phase typical of many invasive species . . . , or for some other reason." (Page 181; paragraph 1)

[After nearly 40 years of observing them not leaving their little park, it seems most parsimonious to assume that surrounding habitat is not suitable, and that the population is small and only marginally successful.]

> "Captive production is spread across far more breeders than is the case for anacondas or the giant African pythons, and regulations on trade in Boa Constrictor would probably cause economic hardship for a greater number of breeders, but quantification of producer impacts would be better handled in a formal economic analysis." (Page 186; paragraph 1)

[This species should never have been included with the other eight species in the first place. However, if economic impact is a consideration, this species should be removed from this list of nine. If perceived danger (imaginary or not) to the populace is a consideration, this species should be removed from this list. If damage to the ecosystem is a consideration, realize that in 40 years in a small park, the species has done no quantifiable damage to the area where it occurs or the wildlife with which it exists. There are hundreds of thousands of keepers with Boa Constrictors valued in the many millions of dollars.]

> "If hybrids are fertile and exhibit characteristics of both species (for example, cold tolerance of Yellow Anacondas but increased size from Green Anaconda genetic contributions), the resulting hybrid might represent higher risk as an introduced species. However, we judge such a scenario to be fairly unlikely." (Page 211; paragraph 2)

["Fairly unlikely" is an understatement, but still it goes to the authors' credit that they mention the improbability of the scenario. However, this story was released to the media along with the equally unlikely hybrid python fairy tale. We are astounded that in a paper representing itself as unbiased and serious, there is even mention of such far-flung imaginations.]

> "Imports [of anacondas] spiked in 1997 as compared to levels in preceding or ensuing years. It is likely that this spike was related to

the 1997 release of the horror movie *Anaconda*, in which larger-than-life anthropophagous anacondas consumed a variety of B-list movie stars. If the apparent relationship between the movie and import rates is more than a remarkable coincidence, such a spike implies that demand, not availability, drives the import rate of anacondas, and that suppliers can obtain more snakes from wild populations even within a short time period." (Page 236; paragraph 3)

[This statement is incorrect, contradicted by data supplied in the report itself. On page 234, the authors state that from 1989 through 2000 about 1400 Green Anacondas were imported into the USA, averaging about 125 a year. However, CITES records cited in Table A.1 on page 302 indicate 5226 Green Anacondas imported during that period, with the spike occurring in 1996, the year before the release of the movie. In addition, if their speculation was valid, then one would expect to see another spike in 2004 with the release of the movie "*Anacondas, The Hunt for the Blood Orchid*," but no such spike occurred. The authors most likely failed to consider trends and strategies used by importers and exporters to work around quotas and seasons to get the maximum financial advantages. In fact, the similarities between the movie *Anaconda* and some of the claims and possibilities proposed in this manuscript are hard to ignore.]

"Of the eleven hypotheses related to survival, ten apply with roughly equal force to all of the giant constrictors. Of these ten, two suggest that giant constrictors are not likely to establish: (1) Establishment is facilitated for insectivores (none of the giant constrictors are insectivorous), and (2) establishment is promoted for species that actively modify their environment in their favor (for example, digging tortoises). As far as is known, the giant constrictors' requirement for burrows is dependent on other species digging them." (Page 247; paragraph 1)

[The 11 hypotheses are not some important and accepted tenet of invasion biology. They are hypotheses gleaned from a variety of sources and assembled in a table in a recently published paper of one of the authors (see Rodda and Tyrrell, 2008). To synthesize, of the 11, three don't apply to the great constrictors. Four cannot be applied because not enough is known about any of the great constrictors with regard to these hypotheses. Only four of the 11 can be applied. This is invasion biology risk analysis at its finest—if you don't have all the data, then just use what you can and make your best guess.]

"The one survival attribute that varies greatly among the giant constrictors is that of climate match. Some species (for example, Indian Python, Yellow Anaconda, Southern African Python, Boa Constrictor) would find suitable habitat over a broad swath of the American landscape, whereas others (Northern African Python, Reticulated Python, Green Anaconda) would likely be limited to the warmer fringes of the continent." (Page 247; paragraph 4)

[Of course this entire citation and the rest of the paragraph that follows is based entirely upon speculation and unproven hypotheses. We can only imagine that the authors made an accidental misstatement when they state that Indian Pythons, Yellow Anacondas, Southern African Pythons, and Boa Constrictors would likely find "*suitable habitat*" over a broad swath of the American landscape—the issue is suitable climate. It's highly *unlikely* that any of these species will find suitable "habitat" in the continental United States ouside of South Florida.

"Hypothesized attributes affecting reproduction of potential invaders during establishment . . . as applied to giant constrictors." (Page 250; Table 10.2)

[This table outlines what the authors know about the reproduction of the nine species of great constrictors—not much. Of course nothing is known about the Beni Anaconda or the DeSchaunsee's Anaconda, as they have not been in captivity in the past few decades. We can state that none of the others have shown a capacity for extended sperm storage. Interclutch interval is a year or longer in all the seven species that have been bred in captivity. We also point out that none of them can be considered parthenogenic. There is one report of a captive female Burmese Python that underwent an apparently unusual form of parthenogenesis to produce fertile eggs and all female offspring (Groot et al., 2003). This is the only report of which we are aware for any of these species and is an extraordinarily rare occurrence.]

"Eleven traits . . . hypothesized to influence spread success in reptiles and amphibians." (Page 252; Table 10.3)

[Another table based on hypothetically important factors identified in Rodda and Tyrell (2008).]

"Probability of organism establishment for nine giant constrictor species, . . . " (Page 253; Table 10.4)

[This table and the three that follow on pages 259 and 260 illustrate the results of all the risk analyses. It's here to which one turns to see the authors' estimates of the hypothetical level of risk for each of the species to become established. Here all 300 pages of this report are distilled into three categories of likelihood of establishment of the great constrictors, those being High, Medium, or Low. Incredibly, no species has a risk rated as "Low"—about half are high and half are low in each of the tables. To say that a Green Anaconda has roughly the same high probability to establish as, say, an small anoline lizard is clear evidence of the bias of the authors and of the overall unrealistic assumptions and conclusions made by this manuscript.]

"We defer to any potential economic evaluation to quantify the potential costs associated with giant constrictor colonization." (Page 254; paragraph 1)

[By "economic evaluation," they are not referring to the costs to the reptile trade and captive breeding industry if they great constrictors should be placed on the Injurious Wildlife List of the Lacey Act. Instead, for example, they are talking about estimates of the economic losses to city and state economies if tourism drops in South Florida because of fear of loose pythons. Never mind that fear has been purposely implanted in the mind of the public by carefully crafted publicity released by USGS (see Barker and Barker, 2008a) and media campaigns stoked by animal-rights organizations, Florida legislators, and academic invasion biologists acting in their own interests.]

"A *potentially* devastating impact to the nation's agriculture could occur *if* the deadly cattle disease heartwater *or some other* tick-borne disease were to become established in the United States and be transmissible through reptile ticks. . . . " [italics ours] (Page 254; paragraph 5)

[Even if this speculation came to pass, it's difficult to believe that the nation's agriculture would be endangered by ticks that are stuck to pythons found only in extreme South Florida. Even the exaggerated climate matches made for each species don't project that the great constrictors will be wandering through the cattle ranches of this country.]

"Direct predation on livestock will occur if any of the giant constric-

> tors become established in the United States. . . . This prediction is very certain because livestock losses have been widely documented in Florida (by Burmese Pythons, North African Pythons, and Reticulated Pythons). However, the extent of the damage is much less certain." (Page 255; paragraph 1)

[Just exactly how have "livestock losses" been widely documented? The authors fail to provide any reference on which they base this charge. To read this, it sounds like prized bulls are being attacked and eaten out in the pastures. The authors fail to provide information as to just exactly what they are referring but we are pretty sure that it must be POULTRY. Native snakes, hawks, owls, feral cats, raccoons, the neighbor's dog, mink, skunks, foxes, and just about anything else with sharp teeth will eat chickens every chance they get—but if the great constrictors do it, it is called "direct predation on livestock." The authors note that the Asian pythons may eat pigs, and, considering that the environment and ecology of South Florida is devastated by feral hogs, isn't that a good thing?]

> "Predation on pets is likely to be of limited economic importance, but acutely felt by the bereaved pet owner." (Page 255; paragraph 2)

[We note the irony that this report will be considered as strong evidence (by those who haven't read it closely) that the great constrictors should be placed on the Injurious Wildlife List. This will damage the commercial value of these snakes, destroy American family business, cause bankruptcies and foreclosures in the times of great economic hardship, yet we are to empathize with some imaginary "bereaved pet owner"?]

> "All of the giant constrictors could further endanger watchable wildlife species that presently constitute a significant draw for ecotourists. Colonial bird rookeries (for example, Wood Storks) are a particular tourist draw, and are potentially vulnerable to depredation by a new nocturnal and opportunistically arboreal predator. Where their ranges overlap, all of the giant constrictors could significantly reduce stocks of economically-important fur-bearers such as beaver and muskrats." (Page 255; paragraph 4)

[Bhatt (1991) notes that his *Python molurus* study site in Keoladeo National Park, Bharatpur, in central India is the wintering grounds of the western flock of the endangered Siberian Crane. This must at least allow for the possibility that Wood Storks will also be able to co-exist with Burmese Pythons in the Everglades. Regarding the "economically-important-furbearer" industry, we certainly do not want the great constrictors to compete with the steel-traps. Never mind that beavers and muskrats are considered to be pest species in many parts of their ranges. Are beaver and muskrat pelts economically important in Florida? We note that the Florida Trappers and Fur Hunters Association boasts that its 2008 membership was approaching 150 members. Of course, most members are "nuisance animal removers, varmint chasers, turtle catchers, USDA trappers, hog trappers and ferral (sic) animal removers" and not beaver trappers (www.floridatrappers.org).]

> "A most difficult aspect of this threat is its irreversibility. Once an introduced giant constrictor becomes well-established, there is no known method for removing the threat, . . . and thus recovery of endangered species in an infested area is a prospect likely to be diminished or even eliminated permanently. In this respect, invasive species constitute a more enduring threat than pollution, overexploitation, or habitat degradation." (Page 256; paragraph 4)

[Let's get this straight—first, aren't the generic "endangered species" mentioned in this plea already endangered when great constrictors come onto the scene. It's NOT the great constrictors that have made them endangered. In the 30 to 40 years that Burmese Pythons and Boa Constrictors have lived in South Florida, there is not a single native species that has had its status reclassified to threatened or endangered due to the presence or actions of these introduced snakes. Second, don't most endangered species have that status because of "pollution, overexploitation, or habitat degradation"? What about overpopulation, overdevelopment, and traffic? Third, here the claim is made that the danger from great constrictors is more "enduring" than the factors that already threatened these generic endangered species? Does this mean the authors have solutions for overpopulation, pollution, overexploitation, habitat degradation and other destructive forces that plague nature and ecosystems throughout the world?]

> "Although it is difficult, or perhaps impossible, to fully quantify perceived impacts that have no overt economic or ecological impacts, it is notable that colonization by giant constrictors would affect human relations to the rural landscape significantly, and not in a good way. Perhaps a mother would no longer allow her children to explore the woods unescorted, or to swim in a creek. Perhaps a child would have fewer opportunities to experience the full range of native wildlife. Loss of these pivotal developmental opportunities comes at a cost that we can appreciate even if we cannot readily measure it." (Page 257; paragraph 2)

[This is truly heart-wrenching. However, few mothers would encourage their kids to swim in creeks and canals in South Florida as most are well aware of the dangers, even if the authors are not. There are huge predatory reptiles called alligators already living in essentially all the waterways of Florida, with a concentration in south Florida. An average alligator weighs more than double what a large great constrictor weighs, and big alligators weigh more than 1000 pounds. Alligators are known to kill and eat pythons and humans. The largest venomous pitviper in North America, the eastern diamondback rattlesnake, lives along the pathways through the woods of Florida. Cottonmouths abound in the swamps. South Florida is a wonderful place because it is not a tame place. It has always been a place to keep the dog on a leash and the children close and in sight. The presence of great constrictors will not affect what have always been considered prudent and safe actions and activities in South Florida.]

Qualifiers

Throughout the paper we noticed the poor quality of the statements being made and the preponderance of qualifying terms that allowed unsupported statements to be made. A vocabulary search found the uses of these qualifying terms: "may" (318 uses in the text); "likely" (306); "potential" (160); "could" (138); "maybe" (137); "might" (103); "probably" (80); "potentially" (44); "appears to" (40); "uncertainty" (26); "possibly" (17). By our count, these 11 qualifying terms appear in the manuscript 1369 times. The manuscript searched was the 260 pages of the body of the text, not including the introductory pages and References Cited pages. These qualifying words appear on average 5.3 times per page. More than one out of every hundred words in the manuscript is a word that qualifies and weakens any statements that are being made.

The Great Constrictors Come to Texas

We note that the climate-matches that have been performed for each of the nine species in their biological profiles all predict that South Florida is the closest thing to nirvana that we have to offer to all of them. However, extreme South Texas is also predicted to be suitable climate and habitat. We are Texans living in South Texas, and we here state that while this might seem possible in theory, it is so highly unlikely as to be close to impossible. Absolutely no one arrives in South Texas, looks around and thinks, "Wow, this is exactly like South Florida."

There are major differences between South Florida and the Rio Grande Valley, the southmost tip of Texas. First, there is no Everglades National Park to serve as 1.5- million acre, swampy refugium, as is the case in South Florida; we cannot overemphasize the importance of that fact. South Texas is colder in winter than South Florida because of what is called the "continental effect—it is not a peninsula surrounded by temperature-mediating warm seas like Florida. What little surface water does exist in South Texas, mostly ox-bow lakes locally called *resacas*, is both heavily populated with human habitations, and used for irrigation. Even the Rio Grande is bone-dry most of the time. More than 95% of the original Tamaulipan thorn scrub habitat is gone, replaced with fields of onions, carrots and other produce. Sugar cane fields would undoubtedly lure pythons and thirsty anacondas wandering around the huge, empty, hot, flat fields, but sugar cane is surrounded and burned from all sides simultaneously annually or biannually, killing all wildlife hidden in the thick vegetation. There is heavy traffic on most roads day and night, and mechanized agriculture rules the fields. There is vegetation along a few stretches of the Rio Grande, but the nocturnal human traffic through those areas is heavy. Consider that Boa Constrictors naturally occur in Tamaulipas, Mexico, 120 miles from the southern tip of Texas, but show no evidence of extending their range northward. We here state that it is our strong opinion that there is no prospect of any of these nine snake species becoming established in South Texas.

Conclusion

Throughout the American South and Southeast, professional pest exterminators are often called upon to exterminate snakes. Often, out on a call, an exterminator will volunteer, at a small additional charge, to put down some chemicals that they claim will deter any snakes that are thinking of passing through, and exterminate any already present. Regardless of whether or not any snake has actually ever been spotted, the exterminator will recommend that you go ahead and let him take care of the "problem." If ever you ask any exterminator "Should I exterminate for snakes?" that exterminator will always answer in the affirmative.

Robert Reed and Gordon Rodda are USGS invasive-snake biologists. As such, they are the government pest exterminators in charge of snakes. That has defined their careers. Whenever they are asked "Should we be worried about being invaded by snakes?" you can bet they will say "Yes, absolutely, and you better start worrying now," just like any good exterminator.

A serious flaw in this report is that it was not composed by impartial authors. Both authors and their employer, the USGS Invasive Species Program, stand to benefit if great constrictors can be made to look like serious threats to the environment of this country. This document is not science, it is opinion and surmise laced with citations that make it seem far more authoritative than careful reading will reveal.

This document appears to us to be a sales pitch designed for one purpose—to persuade legislators and regulators that it is now time to start worrying about exterminating the great constrictors. All analyses in this paper are based on hypothesis and estimation. This is crystal ball fortune-telling disguised as science.

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What You Missed at the December Meeting

John Archer
j-archer@sbcglobal.net

I walked into a room full of great looking food and convivial folks on December 30. Our December meeting is devoted to just having a good time and enjoying food, drink and good company. We took the whole meeting to do what it seems as though we never get enough time for at the regular meetings, talk among ourselves. The CHS board asked Deb Krohn to follow up her terrific job of running the hospitality suite at the Midwest Herp Symposium by acquiring food for this meeting, and true to form, she managed to set a resplendent table for us. Of course, Deb didn't provide all the food because CHS vice-president Jason Hood had asked members to provide some sort of dish, and the variety, quantity and quality of the edibles was astounding. Dan Nathan brought iguanas and set up a huge display with over two dozen happy lizards weaving their way through his construction. Bob Bavirsha had a slide show running of some of the many animals that are up for adoption. Josh Chernoff finally got all the time he wanted to hold the raffle. We saw people that we don't see the rest of the year. Nothing like free food to bring herpers out on even the coldest of nights!

Lots of folks brought baked goods, but these cupcakes were special.

In spite of the party atmosphere, business had to be accomplished, so there were the usual mentions of upcoming shows, board meetings, means to membership, the value of our library, and available adoptions. A plea to take part in the opposition to the ban-the-giant-snake S373 bill was again expressed. This is a bill that is bad law from almost any perspective, and if those of us who care about these animals don't fight against its passage, it is not likely that others will. You only need to Google S373 to find sites that will educate you about this bill, and then write your representatives in Washington letting them know what you think. Get on it! All this was conducted without the normal solemnity that surrounds the business portion. Josh held a leisurely raffle and Dan Nathan presented an iguana to a very lucky Teri Maciuszek who had expressed a desire for a nice calm one. During the entire meeting people were mingling, eating, and talking, usually not at the same time. Of course, I couldn't let everyone continue to relax and have a good time, so I gave a little speech. I know most of you who attend the meetings are really sick of hearing me speak, but I don't normally get to say anything that's not business or speaker related, so I took the opportunity, quieted the masses a little, and gave a somewhat thrown-together "State of the Society" speech. Thrown together because I only thought of doing it as I drove to the meeting.

I think many of you don't know enough about the CHS and what your society accomplishes, so I projected the last available yearly financial report on the big screen and with that exciting start (nothing like a financial chart to put a bunch of herpers to sleep), I covered a little of what the CHS accomplished in 2009. You need to know too, so follow along on page 20 of this *Bulletin*. I skipped right to expenses on the chart, because to me that represents what we do. I'll mention income briefly later. The first line is adoptions. Many of us have adopted animals or helped place animals, but adoptions chairperson Linda Malawy and Bob Bavirsha certainly do more than most. Those two

Deb Krohn adds the finishing touches to a table full of goodies.

Dan Nathan finds a home for an adopted iguana with Teri Maciuszek.

individuals have easily placed a couple of hundred animals this year, from people who voluntarily want to give up their animal to handling seizures and confiscations. Dan Nathan (now known as the iguana man) is becoming prominent in the placement of green iguanas and keeping many himself. Remember that these animals would probably be euthanized if it weren't for the efforts of society members. Saving animals is an important part of what the CHS does.

The next line under expenses is grants, and in 2009 your society gave nearly five thousand dollars to various studies, from effects of landscape alteration on freshwater turtles to fecal hormonal analysis of prehensile-tailed skinks. Our mission statement includes conservation and education and the grants program serves both these functions. For 2010 the CHS has received about two-dozen grant applications, and with a top limit of $1000, these grants can have huge effects on the field of herpetology. The CHS grant committee (Mike Dloogatch, Deb Krohn, Amy and Steve Sullivan, Linda Malawy, and Jason Hood) evaluates all applications and only the best get rewarded.

One of our largest expenses is the printing of the *Bulletin*. About half of the members of the CHS are not within the Chicago area, and while I'm certain some are members because they understand the value of the work the society does, most just want to read the *Bulletin*. The quality of the *Bulletin* would not be what it is without the constant attention and work of Mike Dloogatch, its editor. Note that your dues do not even cover the cost of printing and mailing the *Bulletin*, so the next expense justifies itself by making up the difference.

ReptileFest (April 10–11, 2010) cost us over $26,000 in 2009 and was worth every penny. Well, maybe not every penny, because with that large a budget I can't guarantee that there wasn't some waste, but under income you'll see that Fest brought in over $38,000. ReptileFest is our largest fundraiser, but that may not be the most important factor of 'Fest. Remember that our mission includes education, and last year ReptileFest reached over 5500 people in two days, including people seeking care instructions, buying instructions, trying to get over their fears, or just interacting with the many and varied animals always present at 'Fest. It is the largest educational reptile and amphibian show in the country (maybe the world, but some of our overseas members will have to weigh in on that). We sell not one animal. The best part is that it's fun for everyone involved, and I have yet to meet anyone who helped with 'Fest that didn't want to do it again. Last year we had over two hundred people who helped make that show what it is.

ReptileFest is not the only show we do of course, and while the next line shows only a $15 expense for other shows, it obviously understates the value of the time and energy that CHS members put in through out the year taking their animals to share with the general public. Members such as Dick Buchholz, Lawrence Huddleston, Josh Chernoff, Kathy Blanton, Bob Bavirsha and many others continually take the trouble to haul their animals all over the Chicago area, handling regular shows such as the Notebaert and the All Animal Expo in DuPage County as well as a multitude of other venues from huge affairs to small classrooms, most coordinated by the efforts of Jenny Vollman. They get the message out.

The large figure for insurance may seem overkill, but we try to protect our members as well as our animals. Liability insurance is a must, but it will never take the place of common sense. Remember, you deal with animals that can bite, and though most dogs and cats can bite harder than most of our animals, we have to deal with public perceptions. Realities of life.

We had nearly $1500 in expenses for items to sell. We sell small items to raise money and, since many of these things have our name on them, to spread awareness about your society. Members are always on the look out for merchandise that reflects well on the CHS and herps.

The line for speaker reimbursement is only about $1300! What a bargain! For most months of the year, we bring top speakers from all over the world to Chicago where members can learn the latest on topics such as king cobra research, python breeding, endangered species recovery efforts, and physiological discoveries in the herp world. In 2009 our speakers included Dan Thompson on Blanding's turtle recovery efforts, Timothy Herman on saving the Kihansi spray toads, James Parham on worldwide anthropogenic effects on turtles, Dave Barker on breeding pythons, Brian Grieg Fry on Komodo dragons, Kate Jackson on Congo research, Mark Mitchell on the role of UVB in snakes and turtles, Kathryn Tosney on the effects of selective breeding in bearded dragons, Matt Goode on king cobra research, and Carl Koch on burrowing in hog-nosed snakes. You may not know every one of these speakers, but all were not only experts in their fields, but also excellent at speaking, and they brought to our membership a depth and breadth that is impossible to find in papers or books. Plus you could have dinner with them after the meeting. Money well spent and a job well done by Jason Hood in arranging for these speakers.

The $8500 spent on the symposium is a once every few years expense, that actually made the CHS money this year. Making a profit is good, but it's nice to know that your society hosted the Midwest Herpetological Symposium this year with a list of speakers and a welcoming spirit that truly maintained our status as the finest regional herp society in the country. With Jason Hood coordinating, members such as Mary and Rick Hoppenrath, Deb Krohn, Nick D'Andrea, Andy Malawy, Jenny Vollman and many others put together an event that poses a challenge for next year's host to match. It was a class act from start to finish.

So what has your membership in the Chicago Herpetological Society given you? I don't know. I can say that your society has given much to the field of herpetology and contributed to the welfare of many of these animals we're so interested in. I named folks because I want to emphasize that the society is its members. I can't possibly mention all of the folks who every day accomplish the ordinary and extraordinary things that keep this society a viable and valuable force in the world of herpetology. Just by belonging, you're doing good work, but if you're just reading your *Bulletin* and nothing else, you could be doing more and getting more enjoyment out of your membership. Call us, email us, or write us if you have ideas for improvements or want to make more of a contribution. The Chicago Herpetological Society is the premier regional herp society in the country. With your help, we'll maintain that status for a long time.

Chicago Herpetological Society
Income Statement: January 1 – December 31, 2009

Income		Expense	
Adoptions	$ 977.00	Adoptions	$ 530.63
Grants	159.00	Grants	4,757.00
Membership dues	13,405.80	Bulletin printing / mailing	17,953.91
ReptileFest	38,494.00	ReptileFest	26,461.12
Other CHS shows	775.00	Other CHS shows	15.00
Midwest Symposium	10,447.06	Midwest Symposium	8,589.50
Merchandise sales	3,036.50	Merchandise Sales	1,442.46
Interest	247.39	Bank / PayPal fees	156.24
Donations (unrestricted)	346.00	Donations	300.00
Amazon.com	87.46	Membership related	533.84
Bulletin display ads	250.00	Liability Insurance	5,572.00
Bulletin back issues	2.50	Library	30.04
Raffle	737.00	Licenses and Permits	126.00
Miscellaneous	59.16	Postage	1,584.16
		Office supplies	60.22
		Rent (storage)	240.00
		Speaker Reimbursement	1,352.06
		Telephone	209.40
		Miscellaneous	294.38
Total Income	$69,023.87	Total Expense	$70,207.96

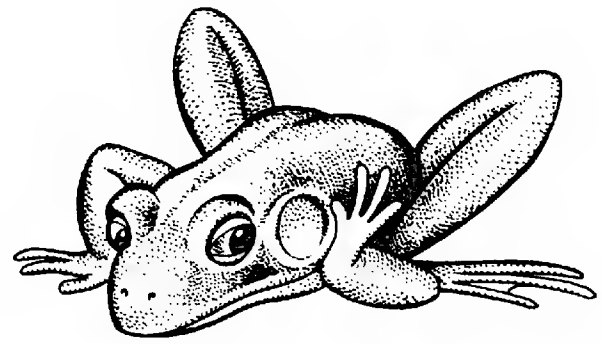
Net Income ($1,184.09)

Chicago Herpetological Society
Balance Sheet: December 31, 2009

Assets	
Checking	$ 8,279.67
Money market	35,578.11
PayPal	835.00
Postage on deposit	429.97
Total Assets	$45,122.75

Equity	
Restricted – Adoptions	$ 6,970.36
Restricted – Grants	87.00
Restricted – Massasauga	426.00
Retained Earnings	38,823.48
Net Income	(1,184.09)
Total Equity	$45,122.75

The Tympanum



Dear CHS Grants Committee:

I'm writing to report on the 2009 research season for our wood turtle study.

Demographics

For the season, we identified a total of 21 turtles through visual surveys. Three turtles were found at our initial site in Swanzey [New Hampshire], 15 were found at our second site in Richmond, and three were found incidentally in nearby areas. In total, females far outnumbered the males: 16 females to 5 males. We found turtles more quickly in Richmond and more slowly in Swanzey. As a result, we concentrated our efforts in Richmond and did not attempt to take tissue samples for DNA analysis, which required collecting tissue from 8 individuals in each location. We were unable to find any nesting areas although we believe we have narrowed the choices as a result of the radio-tracking.

We estimated age by counting rings on the plastron. We found the males ages ranged from 12 to 25 (median age 18), females ages ranged from 6 to 25 (median age 16.5). Weights ranged from 261 g to 1131 g (average weight of all individuals was 688 g). We knew of several individuals that had the date carved into the shell years ago but were able to find only one this year. That individual was dated 1995 and was about 25 years old. . . . At least one individual from each locale was reported to New Hampshire Natural Heritage. . . .

Three individuals were not marked for identification: two . . . were found at a moment when we didn't have a gear bag. One small female was found moments after being hit (and killed) by a car.

In September, we recorded a mortality of a radio-tracked female. The female disappeared in mid-August after a strong summer storm event. We located the radio signal well outside the study area and after five trips to the area of the signal we finally recovered the carcass in mid-September. The carcass was underwater, under about a foot of sand and stick debris. The body and shell were not damaged and it appeared that the turtle had been trapped in the debris and had drowned. The sticks were entangled with each other in such as way that digging to find the carcass was difficult and as a result, we concluded that the turtle was unable to get out of the debris. Whether the turtle was alive at the moment it became entangled in the debris, we were unable to determine.

Habitat Use

Initially, four turtles were tracked using radio tags. In August, one transmitter fell off and we replaced it on another turtle (we were unable to find the original turtle again). After finding the mortality, we placed a transmitter on another turtle, basically keeping four transmitters in use throughout the season.

Turtles were tracked (by Antioch University grad student Mari Clemmer) three times per week at varying times of day for the season and GPS points were taken each time a turtle was located. I've added the GPS points to a map of the Richmond site (showing a stream buffer of 250 ft.). . . . Although we have not completed the statistical analysis (regarding the turtles' use of specific habitat types), it is evident from the map that some turtles travel more than 250 ft from the stream. This concerns me because New Hampshire law gives Shoreland Protection to 250 ft for 4th order streams and larger. However, the turtles' travel outside 250 ft means their habitat is not entirely protected. Further, at our site in Richmond, the stream is smaller than 4th order so the turtles' habitat is not protected at all. Even with shoreland protection, building activity can take place within the buffer by permission of the local conservation commissions.

Even with the data still in raw state, we have learned a lot. I'm putting together a small presentation and plan to meet with conservation commissions in the area to talk about wood turtle habitat protection. I'm hoping that if I give a presentation to some of our local concoms, they will proceed with more caution.

For 2010, we have another Antioch grad student who is interested in participating in the study. She is particularly interested in learning what areas are being used for nesting.

Thank you for supporting this important project in 2009 [with a 2009 CHS grant]. Best wishes, **Dan Zeh, 169 Highland Circle Rd, Swanzey, NH 03446-2519, danzeh@ne.rr.com**

Herpetology 2010

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

DIVING AS A PERFORMANCE MEASURE IN LIZARDS

K. M. Hare and K. A. Miller [2009, Herpetologica 65(3):227-236] note that measures of performance are used to quantify the ability of an individual to execute specific activities. In lizards, sprint speed is the most commonly evaluated measure of performance due to its relationship with biological fitness, presumably via increased effectiveness of foraging and escaping predators. Some lizards also use the aquatic environment and dive underwater as an effective means of foraging and/or escaping predators. The authors tested the usefulness of diving as a measure of performance in a small, diurnal lizard that frequently dives into intertidal water. Adults of *Oligosoma smithi* were encouraged to dive and the maximal duration of their dive as well as their behavior were recorded. Eighty-three percent of the 46 individuals dove in the six trials, with the longest dive time recorded at 6 min 36 s in a pregnant female. The diving ability of *O. smithi* was not related to pregnancy, whether an individual had eaten, or any of the morphological measures taken. The authors also searched for records of duration of diving in other lizards as a means of determining whether diving in water is widespread. Few data are available on duration of diving for other lizards. The data from this study suggest that, for species that submerge in water to forage and/or escape predators, diving ability should be considered as a measure of overall performance.

LEOPARD TORTOISE HOME RANGES

M. K. McMaster and C. T. Downs [2009, J. Herpetology 43(4): 561-569] note that seasonal shifts and overlap in home range are poorly known in the leopard tortoise (*Stigmochelys pardalis*). Consequently, these, together with daily distance moved, were investigated in the semiarid Nama-Karoo, as a function of season, sex, and body mass. Annual home-range size was significantly greater for telemetered compared with nontelemetered tortoises stressing the importance of telemetry in spatial ecological studies of tortoises. Consequently, only telemetered tortoises were analyzed further in terms of variation between seasons and sexes. Home ranges differed significantly with season and were smallest in winter, when tortoises were less active. Seasonal home-range size did not differ between sexes. Considerable individual variation existed in the amount of home-range overlap both within and between sexes. Daily distance moved in each season was highly variable for each individual and between individuals. However, the least movement occurred in winter in all individuals. Home-range size and daily distances moved in the active seasons were larger than for leopard tortoises found in more mesic habitats, suggesting a resource availability effect. Increased home-range size, in conjunction with their low density and population size, has implications for leopard tortoise conservation in semiarid regions in terms of planning and designating conservation areas. Variation in home-range size with regard to habitat type must be considered when planning terrestrial tortoise conservation efforts.

SNAKES NEAR ROADS

D. A. Patrick ans J. P. Gibbs [2009, J. Herpetology 43(4):716-720] note that roads cause direct mortality of animals, but less is known about how this mortality translates into changes in populations. This is particularly true for snakes, which have been subject to little research at the population level compared to other taxa. The authors studied the effects of proximity to a heavily traveled road on snake populations in three old-field sites at Cicero Swamp Wildlife Management Area in Cicero, New York. They conducted 26 surveys of snakes from June to August 2006 on a regular grid of cover boards at different distances from the road and nearest forest edge and measured the microclimate at each cover board. Adult common gartersnakes, *Thamnophis sirtalis*, and northern brown snakes, *Storeria dekayi dekayi*, occurred independently of distance from the road but were more abundant farther from the forest edge. The lack of a "road effect" was surprising, given that both species of snakes have been shown to be prone to road-mortality in previous studies and could be caused by either snakes avoiding crossing roads or mortality events being rare. Increased abundance of snakes farther from the forest edge suggests that snakes prefer sites that receive direct sunlight for longer periods of the day. The study indicates that snake abundance is not necessarily influenced by proximity to roads and that the location of other habitat edges such as a forest-grassland interface may be a more important driver of patterns of spatial distribution.

TUATARA TERRITORIALITY

J. A. Moore et al. [2009, J. Herpetology 43(4):570-578] note that in reptiles, phenotypic measures such as body size usually predict a male's success in territorial interactions. Recent evidence from fish, birds, and mammals has shown that genetic heterozygosity also has a strong influence on competitive ability and territory quality. The authors provide a comprehensive assessment of the social structure and factors affecting male territory quality and aggressive behavior in a dense population of tuatara, *Sphenodon punctatus*, a long-lived reptile that maintains long-term territories, on Stephens Island, New Zealand. The only significant predictor of female access and competitive ability was male body size, and there was no relationship between male body size or condition and individual genetic heterozygosity. Body size, body condition, and heterozygosity did not predict territory size. Also, heterozygosity, body condition, and territory size had no relationship with the number of females to which a male had access. Large males were more effective at (1) monopolizing areas where females were most dense and (2) guarding females by consistently winning aggressive encounters with other males. The finding of no relationship between territoriality and heterozygosity probably reflects the genetic background of this large, outbred population or that behavioral attributes or neutral heterozygosity are not appropriate individual fitness correlates for these long-lived reptiles.

Unofficial Minutes of the CHS Board Meeting, December 18, 2009

The meeting was called to order at 7:50 P.M. at the Schaumburg Public Library. Board members Dan Bavirsha, Aaron LaForge, Linda Malawy and Brad Trost were absent.

Officers' Reports

Recording Secretary: Cindy Rampacek read the minutes of the November 13 board meeting, minor corrections were made and the minutes were accepted.

Treasurer: Andy Malawy presented the financial reports. He also presented the Midwest Herpetological Symposium numbers

Membership Secretary: We are showing a nice increase in memberships, above the usual grant applicant memberships. A lot of memberships are coming in through PayPal, so that seems to work nice. Mike Dloogatch presented the list of expired memberships.

Vice-president: Jason Hood asked everyone to attend to the December 30 holiday meeting and get on the forum to list the item you plan on bringing. Rick Hoppenrath has begun lining up speakers for 2010. Jeff Lemm will be speaking in April. Karen Eckert will be coming in May. George Heinrich will be speaking in August on the turtles of Florida.

Corresponding Secretary: Deb Krohn had nothing to report.

Sergeant-at-arms: In Dan Bavirsha's absence it was reported that there were 33 people at the November meeting.

Committee Reports

Shows:
- Notebaert show, January 2–3; Jenny is looking for volunteers.
- Great Lakes Pet Expo, February 6, Milwaukee Wisconsin.
- Emily Oaks Nature Center, February 9; John Archer will be doing this.
- NARBC, February 13–14.
- Chicagoland Kids Expo, February 20–21.
- Reptile Rampage, March 14.
- Chicagoland Family Pet Show, March 19–21
- ReptileFest, April 10– 11.

Rick already has cards advertising 'Fest. Our advertisement for *Reptiles* magazine is ready. We are also advertising again with Oakley. Rick has looked into billboards and will keep looking, but he suspects they will be out of our price range.

Grants: Mike got an email today from a previous recipient and he sent a great summary as well as a map of radio-tracking. Mike will be publishing the summary in the *Bulletin*. We have received a lot of grant proposals and letters of recommendation so far.

Old Business

Rules for selling dry goods at monthly meetings: John lost the sheet of paper that Rick gave him and he will get it again from Rick. .

New Business

The Dupage All Animal Swap will be linking to the CHS on their site.

S373: The CHS will issue a basic statement showing disapproval of this proposed legislation.

Listserv: The Virginia Herp Society is looking to open up an email list for herp society boards. Deb Krohn will sign up for this as our corresponding secretary.

The Notebaert will be screening a video from Ravenswood Media, *Why Frogs Call and Why We Should Listen*, at 7:30 P.M. on Wednesday, January 13. Dr. Michael Lannoo will give a presentation afterwards on the current status of frogs in the U.S. and his research in southern Indiana with the crawfish frog.

Round Table

Jason shared that it apparently is not illegal to release captive-bred native reptiles in Florida

The meeting adjourned at 9:05 P.M.

Respectfully submitted by recording secretary Cindy Rampacek

Advertisements

Project Squirrel: Winter is a difficult time to herp for most of us but that's no reason to give up wildlife-watching. Tree squirrels are important members of both urban and rural ecosystems and they can be indicators of ecological change that affects all animals. Many neighborhoods have just one species of squirrel, others have two. Project Squirrel is a citizen science program suitable for all ages that seeks to document squirrel distribution on a local level throughout the nation. So whether you're at home planning for the spring or out in the field, we hope you'll tell us about the tree squirrels near you at ProjectSquirrel.org

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail: GrmtRodent@aol.com.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. Our mice and rats are vacuum-packed to greatly extend freezer life by reducing freezer burning and preserving vitamin and nutrient content. We feed our colony a nutrtionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. For a complete price list please visit our web site, www.themousefactory.com. We accept all major credit cards, PayPal or money orders. Call us **toll-free** (800) 720-0076 or send us an e-mail at info@themousefactory.com. Write us at PO Box 85, Alpine TX 79831.

For sale: **high quality frozen feeders**. Over a decade of production and supply. Seven sizes of mice availabe: small newborn pinks up to jumbo adults. Prices start at $25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: Rats—live or frozen. I breed rats for my collection of boas so only top quality lab chow and care will do, I'm now offering surplus animals for sale. Located in far south suburbs of Chicago. Only orders of 20 or more please, no large rats will be available. For current availability and prices, please e-mail Steve at smuys@sbcglobal.net.

For sale: Trophy quality jungle carpet, diamond-jungle, and jaguar carpet pythons. Website: moreliapython.googlepages.com E-mail: junglejohn@tds.net

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33rd International Herpetological Symposium

July 21 - 24, 2010 Tucson, Arizona USA

The Arizona-Sonora Desert Museum and the International Herpetological Symposium Inc. invite you to attend the 33rd Annual Meeting of the International Herpetological Symposium. The meeting will be held at the Radisson Suites Hotel Tucson Airport in Tucson, Arizona.

Please join us for three days of presentations on herpetology, herpetoculture, and reptile veterinary medicine. There will also be a reception and icebreaker sponsored by REPTILES Magazine, banquet and auction. The IHS vendor tables will be open to the public and IHS registrants at no charge during the entire conference with an incredibly diverse selection of herpetocultural supplies, artwork, books, and other items. All attendees are invited to display their best herp-oriented photography and artwork during the meeting.

REGISTRATION information and other details about this unique herpetological event are available on-line at www.kingsnake.com/ihs/

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, January 27, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **Ray Pawley**, retired curator of reptiles at Brookfield Zoo, who now makes his home near Hondo, New Mexico, will speak about some of his experiences raising Galapagos tortoises at Brookfield and some questions that were left unanswered. In his own words, "While lectures are basically informative (period), this topic is unique in that the audience will be informed AND will hear about some intriguing unanswered questions that arose while we were raising Galapagos tortoises at Brookfield Zoo. The goal of this talk is to share with the audience what we learned in hopes that some individual(s) might want to seek some answers through their own initiative."

At the February 24 meeting, **Dr. Charles Knapp**, Director of Conservation and Research at the Shedd Aquarium, will speak about his work with Caribbean rock iguanas.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., February 12, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: http://www.geocities.com/~chicagoturtle.

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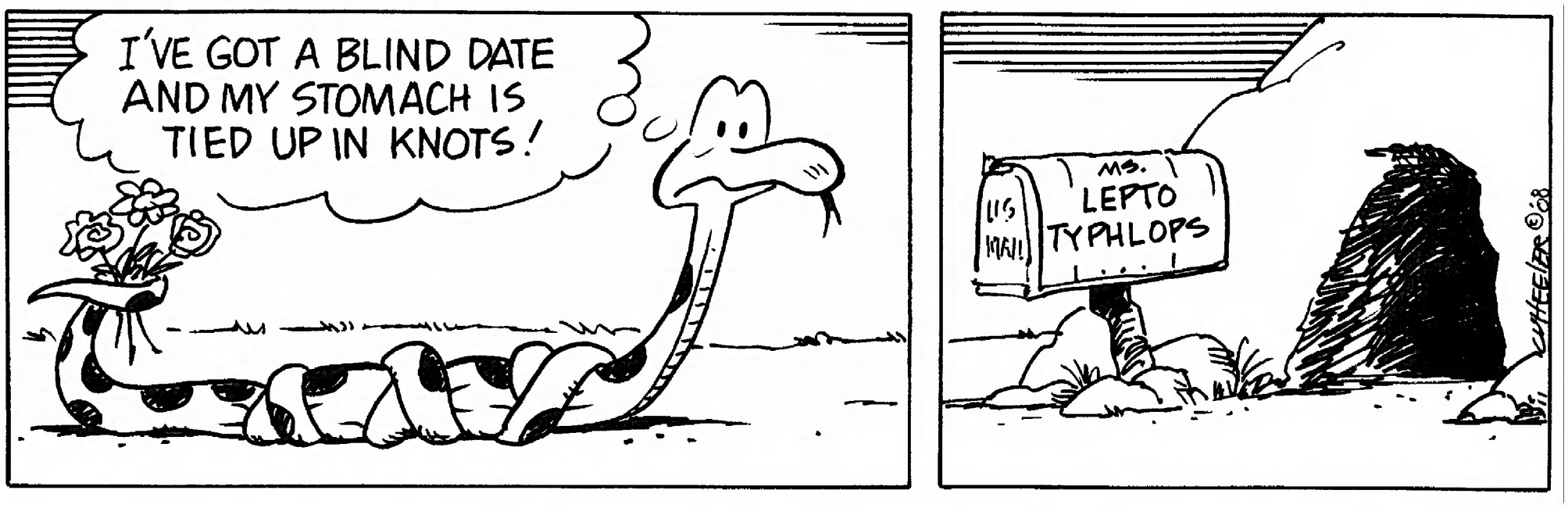

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